THE DEVELOPMENT STRATEGY OF INFORMATION LITERACY EDUCATION FOR POSTGRADUATES IN UNIVERSITIES IN GUIZHOU PROVINCE

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Thesis Title The Development Strategy of Information Literacy Education for Postgraduates in Universities in Guangzhou Province

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Thesis: **The Development Strategy of Information Literacy Education for Postgraduates in Universities in Guizhou Province**

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ABSTRACT

This study is entitled "The Development Strategy of Information Literacy Education for Postgraduates in Universities in Guizhou Province. The purpose of the research is as follows: (1) To investigate the current situation of information literacy education for postgraduates in Guizhou Province. (2) To analyze the main influencing factors of information literacy education quality of postgraduates in universities in Guizhou province. (3) To formulate the development strategy of information literacy education for postgraduates in Guizhou province. Survey respondents from four different types of universities included managers of postgraduate education, information literacy teachers and postgraduate supervisors, a total of 200 people. Research tools include data analysis forms, questionnaires, interview forms and adaptive assessment forms.

The findings revealed that the development status of information literacy education in universities in Guizhou Province has made progress but isn't ideal enough, mainly affected by development planning, form of education, resource input guarantee, construction of teaching staff, education content construction, evaluation of educational quality factors, finally formulated development strategies from the following six aspects: Improve the development plan and administrative management; Innovative the teaching mode; Strengthen resource input; Strengthen the construction of teachers; Enrich the content construction of information literacy; Strengthen quality supervision and rectification.

Keywords: Postgraduate education, Information literacy, Development strategy

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รายงานสรุป

การศึกษานี้มีชื่อว่า"กลยุทธ์การพัฒนาของการศึกษาด้านข้อมูลสำหรับนักศึกษาปริญญาเอกในมหาวิทยาลัยมณฑลกุ้ยโจว(1)เพื่อตรวจสอบสถานการณ์ปัจจุบันของการศึกษาด้านข้อมูลสำหรับผู้สำเร็จการศึกษาหลังจบการศึกษาในมณฑลกุ้ยโจว(2)วิเคราะห์ปัจจัยหลักที่ส่งผลกระทบต่อคุณภาพการศึกษาของบัณฑิตวิทยาลัยในมณฑลกุ้ยโจว(3)กำหนดกลยุทธ์การพัฒนาด้านการศึกษาด้านข้อมูลสำหรับผู้สำเร็จการศึกษาหลังจบการศึกษาในมณฑลกุ้ยโจวผู้ตอบแบบสำรวจจากมหาวิทยาลัยสี่ประเภทรวมถึงผู้จัดการด้านการศึกษาระดับปริญญาตรีครูด้านข้อมูลและผู้ดูแลระดับบัณฑิตศึกษาทั้งหมด200คนเครื่องมือการวิจัยประกอบด้วยแบบฟอร์มการวิเคราะห์ข้อมูลแบบสอบถามรูปแบบการสัมภาษณ์และการประเมินแบบปรับตัว

ผลการศึกษาพบว่าสถานะการพัฒนาของการศึกษาด้านข้อมูลในมหาวิทยาลัยมณฑลกุโจวมีความคืบหน้าแต่ไม่เหมาะสมส่วนใหญ่ได้รับผลกระทบจากการวางแผนพัฒนารูปแบบการศึกษาการรับประกันด้านทรัพยากรการก่อสร้างเจ้าหน้าที่สอนการศึกษาการประเมินคุณภาพการศึกษาสร้างสรรค์โหมดการสอนเสริมสร้างทรัพยากรป้อนข้อมูล;การก่อสร้างความแข็งแกร่งของครูเพิ่มการก่อสร้างเนื้อหาของการอ่านออกเขียนข้อมูลเสริมสร้างการดูแลคุณภาพ และการแก้ไข.

กุญแจสำคัญ: ยุทธวิธีการพัฒนาข้อมูลระดับบัณฑิตศึกษา

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Chapter 1
Introduction

Rationale

World level: The World Education Innovation Summit (WISE) and the China Institute of Education Innovation, Beijing Normal University (2016) jointly released the research report "Facing the Future: Global Experiences in Core Literacy Education in the 21st Century". The results of the report show that information literacy has been listed as one of the seven core qualities most valued by economies and international organizations in the new era, which plays a far-reaching role in improving postgraduate information literacy and application skills, sustainable development and lifelong learning. The new business form of "Internet Plus" and the new wave of "mass entrepreneurship and innovation" have put forward higher requirements for the information quality of graduate students in universities, which requires the field of library and information and the field of higher education to jointly tackle key problems, explore the favorable opportunities brought by the era of big data for information literacy education. Focus on rational balance to promote development, reconstruct the development system of postgraduate information literacy education to adapt to the new situation, provide decision-making reference for deepening the reform of postgraduate information literacy education, and promote the comprehensive improvement of postgraduate information quality and innovation ability, and help the cultivation of university outstanding talents to a higher level. The need to support international postgraduate students' transition, learning and practice through well-developed information literacy training, is key to their success in the course. As international students are important, the internationally focused universities are working to provide a first-class education for international students. One way to ensure the international students can get the most from their experience is to focus on educational support. Since the main challenges are unfamiliarity with information sources and practices, and with academic language, an integrated approach to information literacy can provide them with the technical information and the skills required finding this information, and the knowledge to work at a deeper level in the subject matter.

China level: As the top of the national education sequence, postgraduate education shoulders the dual missions of the supply of high-end talents and the innovation of science and technology, which is of great significance to the realization of the national strategy and the support of the construction of a modern power. At present, there is an extreme lack of systematic research on information literacy education in colleges and universities, and there is generally only fragmented research on a certain aspect, especially the lack of information literacy education based on the position and perspective of education management. The agenda for further development is in relation to understanding and responding to the different aspects of information behavior (and not simply focusing on searching and citation) and linking training and assessment more closely to stage in the curriculum including the transition to postgraduate study and the workplace. This will only be achieved by collaborative innovations, typically discipline-related, that involve co-operation with academics. Taking this wider perspective on information behavior will also facilitate understanding and development of IL initiatives that take into account the wider context of student information behavior in today's mobile, digital environment (Ellis C, 2017). This study comprehensively expand the existing single factor theory research, follow the basic law of higher education development and talent training, using modern education management science and related management theory, using the "six one" linkage mechanism for graduate information literacy education scientific and comprehensive development strategy, comprehensive education macro planning, education management mode, resource investment guarantee, teaching staff construction, teaching platform construction, quality supervision and evaluation six dimensions, to promote the effective improvement of graduate information literacy education quality.

Guizhou province level: Digital natives are assumed to possess knowledge and skills that allow them to handle information and communication technologies (ICT) tools in a "natural" way. Accordingly, this calls for the application of different teaching/learning strategies in education (A Sorgo, 2016). The "big data" strategy has become one of the three strategic actions for high-quality development in Guizhou Province, and information literacy education has become an important starting point for universities to actively serve the big data strategy. Build to adapt to the new era of information literacy education development

system, actively explore the big data era of information literacy education, from the perspective of higher education management focus resources heavy security, focus on reform and opening up, focus on reasonable balance to promote development, break the contradiction of information literacy education problems, for information literacy education to deepen reform and quality improvement lay a solid foundation, for "big data" strategic action to provide strong wisdom support and talent guarantee. There is a "Matthew Effect" in the theoretical research on information literacy education in China, Universal research subjects were concentrated in developed provinces and high-level universities, Therefore, this research selects Guizhou Province, where information literacy education development lags behind, higher education management is weak, and breakthroughs are urgently sought, as the research object, By combining theoretical exploration with practical research, Accurately focus on the sharp contradictions of "imbalance" and "inadequacy" in graduate information literacy education, Fully learn from domestic and foreign universities to obtain advantageous experience, From the perspective of higher education management, powerful measures to break the innovative development obstacles of information literacy education in Guizhou province.

Research Questions

1. What is the current status of information literacy education for postgraduates in universities in Guizhou Province?

2. What factors affect the quality of information literacy education for postgraduates in universities in Guizhou Province?

3. According to the main factors determined by statistics and combined with the current situation and problems, how to use educational management science to formulate the development strategy of information literacy education for postgraduates in Guizhou Province?

Objectives

1. To investigate the current situation of information literacy education for postgraduates in Guizhou Province.

2. To analyze the main influencing factors of information literacy education quality of postgraduates in universities in Guizhou province.

3. According to the main factors determined by statistics and combined with the current situation and problems, the development strategy of information literacy education for postgraduates in Guizhou province will be formulated by using educational management science.

Research Hypotheses

1. The quality of information literacy education for postgraduates in Guizhou Province is mainly affected by the following factors: development planning and administrative management, form of education, resource input guarantee, construction of teaching staff, education content construction, evaluation and optimization of educational quality.

2. The following strategies can effectively improve the quality of postgraduate information literacy education in Guizhou Province: Improve the development plan of information literacy education for postgraduates by applying modern higher education management science, Innovative the mode of information literacy education for postgraduates, Strengthen resource input guarantee in multiple aspects, Strengthen the construction of teachers for information literacy education, Enrich the content construction of information literacy education for postgraduates, Strengthen quality supervision and rectification of information literacy education for postgraduates.

Scope of the Research

Population and the Sample Group

Population

Managers of postgraduate education, information literacy teachers and postgraduate supervisors in universities in Guizhou province.

The Sample Group

Four different types of universities were selected as sample universities (Guizhou University, Guizhou Normal University, Guizhou University of Finance and Economics, Zunyi Medical University) among the postgraduate universities in Guizhou Province, 10 postgraduate education managers (divided into Stratified sampling method, randomly selected from leadership positions and non-leadership positions), 10 information literacy teachers were selected and 30 postgraduate supervisors from each university (simple random sampling method), a total of 200 people.

The Variable

Independent Variable

It includes the key factors affecting the quality of graduate information literacy education: development planning and administrative management, form of education, resource input guarantee, construction of teaching staff, education content construction, evaluation and optimization of educational quality.

Dependent Variable

Quality (development level) of information literacy education for postgraduates in universities in Guizhou Province

Contents

Based on the new historical orientation of the development of graduate information literacy education in the new era, accurately focus on the "unbalanced contradictions" and "inadequacy" in the development of graduate information literacy education in Guizhou Province, Adhere to the " service needs, Improve quality " as the main line, With theoretical exploration, practical research, comparative analysis, advantage reference as an important starting point, The main content of the study is divided into five vertical levels: (1) Theoretical discussion and development review related to information literacy education and graduate education management; (2) To investigate the current situation of information literacy education for postgraduates in universities in Guizhou Province; (3) To analyze the main influencing factors of the quality of information literacy education for postgraduates in universities in Guizhou Province; (4)

To analysis the advantages and experience of graduate information literacy education management in universities at home and foreign countries; (5) Use educational management science to formulate the development strategy of information literacy education for postgraduates in universities in Guizhou Province; In the study at the same time, the introduction of "development planning and administrative management, form of education, resource input guarantee, construction of teaching staff, education content construction, evaluation and optimization of educational quality" six dimensions form horizontal linkage mechanism, to ensure the research in the "vertical and horizontal interaction, combining" mode of efficient, scientific and reasonable to adapt to the new era of Guizhou graduate information literacy education development strategy.

Advantages

The research direction focuses on the urgent need for high-level talent cultivation: Postgraduate education, as the top of the national education sequence, shoulders the dual mission of high-end talent supply and scientific and technological innovation, which is of great significance to realizing the national strategy and supporting the building of a modern country. Information literacy is listed as one of the seven core literacy that is most valued by various economies and international organizations in the new era, and it has far-reaching significance for improving postgraduate information literacy and application skills, sustainable development and lifelong learning.

The research objects have high representativeness and research value: There is a "Matthew Effect" in the theoretical research on information literacy education in China, Universal research subjects were concentrated in developed provinces and high-level universities, Therefore, this research selects Guizhou Province, where information literacy education development lags behind, higher education management is weak, and breakthroughs are urgently sought, as the research object. Building a development system of information literacy education in universities adapted to the new era, Fully cultivate graduate students' information awareness, information ethics and information ability under the background of big data, To enable students to use information technology to carry out independent learning and scientific research efficiently, It is

conducive to cultivating the information quality and innovation ability of applied talents, Promote the connotative development of information literacy education in universities.

The research contents are systematic and comprehensive: Throughout the relevant theoretical research literature at home and abroad, there is a lack of systematic, all-round and multi-dimensional research on the development strategy of postgraduate information literacy education. The existing research generally only focuses on the fragmented research of a certain aspect of discipline service. This topic comprehensively expands the existing single-factor theoretical research. The "six in one" linkage mechanism is adopted to propose a scientific and comprehensive development strategy for information literacy education, which comprehensively covers six dimensions such as development planning and administrative management, form of education, resource input guarantee, construction of teaching staff, education content construction, evaluation and optimization of educational quality, so as to provide theoretical support and practical reference for the development of information literacy education for postgraduates.

Definition of Terms

Information literacy education in colleges and universities: Facing all stages of information activities in the process of teaching and development, colleges and universities cultivate college students' information ability from the aspects of emotion, behavior, cognition and critical thinking.Including both information search, evaluation, understanding and acquisition ability, also includes the use of information, integration, production and sharing ability, help college students establish in the information consumption, information production, information sharing activities in the correct attitude, responsibility and behavior, to cultivate information oriented critical thinking and innovative thinking as the core, improve college students in participatory information environment sharing information and cooperation ability.

Information literacy education development system: The traditional information literacy education system mainly includes curriculum construction, paradigm discussion and practical teaching, With the comprehensive reform of higher

education and the requirements of core literacy training, Information literacy education is also endowed with richer connotations, Need to combine the diversified requirements of information literacy education in the new era, Building a scientific and comprehensive information literacy education development system, It should fully cover the six dimensions of macro education planning, resource input guarantee, teacher team construction, quality supervision and evaluation, teaching platform construction and teaching mode reform, To remove the obstacles to the development of information literacy education, Comprehensively boost information literacy education to achieve connotative development.

Graduate information literacy education management: with the development and progress of social science and technology, especially the development of Internet technology, the information environment of human society, the original information literacy standard has been difficult to meet the big data era gives information literacy education higher requirements, the traditional information literacy education concept will seriously restrict the postgraduate information literacy education innovation and development. In response to this issue, ACRL released the Information Literacy Framework in Higher Education after the third revised draft, which redefined "information literacy": including the reflective discovery of information, understanding how to generate and evaluate information, and using information to create new knowledge and reasonably participate in the learning community. The core content of the framework is arranged in six boxes, each containing a threshold concept, a set of knowledge and skills, and a set of behaviors. The six threshold concepts are specific: information authority construction and context; information creation is a kind of process; information has value; research is inquiry; academic is dialogue; retrieval is strategic exploration. The information literacy education of this group should be clearly different from the undergraduate information literacy education, which must meet the position requirements of graduate learning and scientific research, and organically connect with the undergraduate information literacy education and couple with the professional education. Therefore, under the new situation, the postgraduate information literacy education should cover the core elements of Higher Education Information Literacy Framework, pay more

attention to information ethics and information ethics, literacy education, information resource management ability, strengthen the subject analysis, retrieval results analysis, improve retrieval scale, and meet the practical needs of postgraduates in the new era.

Research Framework

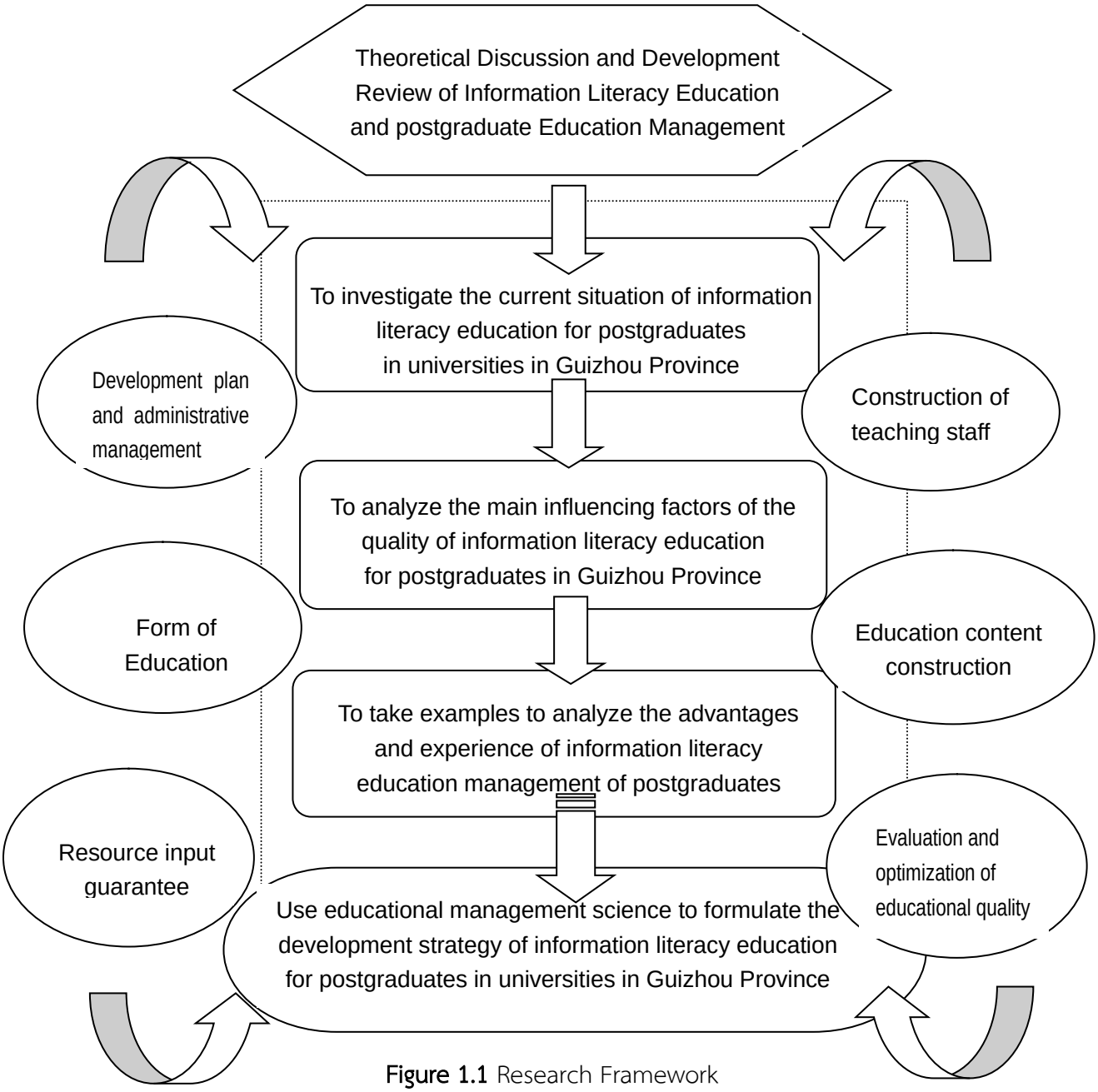

Figure 1.1 Research Framework

Chapter 2
Literature Review

This study uses educational management science and combines relevant research theories at home and abroad, analyze the research status of the concept of Information literacy, the concept of information literacy education, the concept of postgraduate education and the development strategy of information literacy education for postgraduates in universities systematically, describes the research characteristics through bibliometrics, analyze the shortcomings of the current theoretical research. It mainly includes the following aspects:

1. The concept of Information literacy
2. The concept of information literacy education
3. The development strategy of information literacy education for postgraduates in universities
4. Deficiencies in the theoretical research
5. Relate Researches

The details are as follows.

1. The concept of Information literacy

With the development of the information age, the concept of “information literacy” has been continuously injected with new connotations. Domestic and foreign researchers have produced some theoretical research results around this topic, mainly focusing on the meaning of information literacy, the importance of information literacy, and the connotation of information literacy. The specific research situation is as follows:

The meaning of information literacy

“Information literacy” first appeared in 1947, proposed by the National Commission on Library and Information Science (NCLIS), and was defined by the American Library Association (ALA) in 1989: including cultural literacy, Information awareness and information skills. In 2001, the Association of College and Research

Library (ACRL) promulgated the “Information Literacy Competency Standards for Higher Education”, which defined the information literacy competency standards as “knowing when information is needed, and being able to effectively find ability to use information”, which has also become a general consensus in the early development of information literacy education. In 2015, ACRL once again issued the “Information Literacy Framework for Higher Education”, based on the theoretical basis of “element literacy”, and proposed that “information literacy is essentially an element literacy, and it is the literacy that gives birth to other literacy”, and reexamines information in the new information environment (Wang Xiang, 2021).

Jiang Xiaoxi (2011, p.168) upgraded the connotation of information literacy based on the new information environment, and proposed academic information literacy: people should have information awareness in the process of engaging in scientific research activities, be able to identify and define information needs, and use various skills. Obtain, evaluate, and synthesize various types of academic information from a variety of academic information sources, use and manage these academic information, communicate and share information with others through various information exchange technologies, and use original information and predecessors experience to create new information, and to ensure that these actions are carried out under the premise of complying with ethical norms and legal constraints. In the era of information revolution, with the rapid change of information technology and the iteration of new terms and concepts, foreign researchers have deepened and broadened the research content and direction of Information Literacy Education: on the one hand, some scholars focus on literacy to explore the relationship and integration trend between information literacy and theories such as computer ability, digital ability, media literacy and social network.

Karmen Stopar (2019, p.479) used literature analysis tools and other measurement methods to establish clusters of education, “ability” and “literacy”, deeply analyzed the relationship between information literacy, digital literacy, ICT literacy, computer literacy, digital skills and “ability” and “education”, and found clusters related to information literacy education Cluster analysis and other methods

get the decentralized mode of relevant publications and research fields. It is considered that in the current research of information literacy, the relationship between educational theory and computer and information science is weak.

Maria Pinto (2015, p.227) made a quantitative analysis of the literature on ILAHE (Information Literacy Assessment in Higher Education) scientific achievements from 2000 to 2011, determined by analysis method, and used VOSviewer program for scientific mapping to obtain two research fields with different densities and five clusters, including evaluation education, evaluation, student efficacy, learning research and library, Discover and determine the new main research topics related to ILAHE from a multidisciplinary perspective.

Maria Pinto (2020, p.124) stated within the lively and evolving field of IS, an incipient sub-domain with great possibilities for progress, that of Mobile Information Literacy (MoIL), in the convergence of information literacy (IL) and mobile learning, is emerging. In this regard, the application of domain analysis would be the first step toward MoIL's conceptual framework as an academic domain in higher education (HE).

Han Xin, Xiong Caifa (2009, p.183-185) stated in terms of information literacy, in terms of scientific literacy, it is embodied in information acquisition, information screening, information utilization and other aspects of literacy; In the category of humanistic quality, it is manifested in information awareness, information culture and other aspects of literacy; In the category of ideological and moral quality, it is manifested in information legal awareness and information ethics and morality. In terms of mental and physical fitness, it manifests itself in the ability and literacy to improve mental and physical health through access to useful information.

To sum up, the researcher believes that information literacy is a basic skill for people in the information society to understand information resources, master retrieval, integrate information and apply it to practical work. Under the continuous baptism of the information age, the connotation of information literacy has been endowed with the concept of pluralism and dynamic. Based on the development of educational technology and the requirement of self-learning ability, information

literacy in the new environment refers to a comprehensive ability to effectively recognize, query, obtain, utilize, communicate and create information with critical thinking, and promote learning, research and innovation.

The importance of information literacy

Consuelo Garcia (2020, p.12) explained although many students regularly use the Internet and do not have problems with their technical skills, on many occasions they lack critical thinking that helps to differentiate reliable and relevant information from other that is not. In the university context, the ability to correctly find and use specific information is important, especially at master's and doctoral levels, where students need to use of a lot of bibliography and rigorous documentary sources to write their tasks following an academic standard. However, students' prior experience and practice of this ability appears to be limited when entering their university studies.

Bavelier, Green (2010) stated digital nativeness and the development of information literacy cannot be recognized solely as something "naturaland" self-evident, as they are influenced by a number of socioeconomic and societal factors, as well as by personal preferences and the motivation of learners. For example, it is evident that many children use computers or cellular smartphones even before they can read, but that others from the same generation only have their first contact with these technologies when they are forced to use them, eg, in school, which may influence their future competencies and skills.

Andrej Sorgo (2017, p.2) stated whether a person works as a professional or researcher, one such competency is a suitable level of information literacy. Information literacy (IL) is a prerequisite for the fulfillment of the demands of lifelong learning in the future workplace, as well as for the realization of personal choices. As such, information literacy can be regarded as both work-specific and generic. The latter allows public participation, informed decision making and the nourishing of personal interests, while also helping in professional activities beyond the primary field of study.

Muhammad Asif Naveed (2016, p.80) indicated the manifestation of various dimensions of information seeking anxiety in a large majority of research students.

This might have very serious implications not only for students' academic performance but also for research productivity of the academic institutions, both in terms of quality and quantity. If the students' information searches ended up with failure due to anxiety, they could not proceed efficiently and effectively with the research task, because informed decision making was not possible in the absence of relevant and timely information. This would not only affect students' academic performance and research output but also culminate in certain avoidance behaviors which might possibly lead to academic procrastination and even academic dishonesty.

Elahi (2018) underlined after an extensive quantitative study, that ubiquity, immediate access and time availability are an advantage for information access and retrieval. However, the training of students, teachers and information professionals should be improved, and there is good will on the part of all the groups towards Mobile information literacy (MoIL). Academic information search and the development of informational competencies through mobile phones are highlighted, as priority needs.

Saeid Baroutian (2016, p.22) underlined one way to ensure the international students can get the most from their experience is to focus on educational support. Since the main challenges for international postgraduate students are unfamiliarity with information sources and practices, and with academic language, an integrated approach to information literacy can provide them with the technical information and the skills required finding this information, and the knowledge to work at a deeper level in the subject matter.

To sum up, the researcher believes an information literate individual is able to (1) determine the extent of information needed, (2) access the required information effectively and efficiently, (3) evaluate information and its sources critically, and incorporate selected information into their knowledge base, (4) use information effectively to accomplish a specific purpose and (5) understand the economic, legal and social issues surrounding the use of information, and access and use information ethically and legally.

The connotation of information literacy

Yuan Hongjun and Yuan Yifan (2020, p.20) mentioned that information literacy refers to the integrated ability set of readers' reflective exploration of information, understanding of the process of discovery, production, value, evaluation, utilization and creation of new knowledge, and reasonable participation in community learning. At the same time, it is also mentioned that information literacy in universities refers to a comprehensive ability of readers to understand, recognize, discover, capture, evaluate and utilize new knowledge of information.

Zhang Hong (2019, p.86) said that in the information society, the growth of information is intensified, and the life cycle of knowledge is shortened. Contemporary engineers and technicians should improve information literacy, enhance the ability of independent learning and innovation. The connotation of information literacy includes four elements: information consciousness, information knowledge, information ability and information ethics.

Harold Castaneda-Pena (2015, p.445) stated the understanding of information literacy as a basic skill has been a highly contested; scholars have argued over notions including skills necessary to study, to learn and to use the school library. Others place information literacy in the nexus with information sources where the skill depends on the personal knowledge a user has about information and also on the knowledge being applied. This shows that information literacy is directly associated with both academic performances and standardized ways of accessing and assessing information.

Sandy Zinn (2016, p.31) explained characteristics of a successful learner are manifest in the attributes collect, organize, analyse and critically evaluate information; identify and solve problems and make decisions using critical and creative thinking; and communicate effectively using visual, symbolic or language skills in various modes.

Harold Castaneda-Pena (2015, p.455) revealed In relation to the kind of academic tasks that could help students in order to develop information competencies, there are three special tasks recognized by students: research projects

in class, information research tasks in disciplinary fields, and group work. Each one contributes to promote good practices related to information performance in university academic contexts.

Maria Pinto (2020, p.125) stated information literacy includes the need for information, evaluation, use and dissemination as well as the ethical principles derived from the handling of information are based. It need practice and research, instruction and lifelong learning.

To sum up, the researcher believes information literacy must include the following abilities:

(1) to determine and analyse an information need;

(2) to strategically search and access information in all its various forms;

(3) to distinguish between and critically evaluate sources;

(4) to understand the ethical and legal considerations of information;

(5) to create new knowledge.

2. The concept of information literacy education

With the development of higher education, “information literacy education” has become a topic of concern to more researchers. Researchers at home and abroad have also produced some theoretical research results around this topic, mainly focusing on the meaning of information literacy education, the importance of information literacy education, and the connotation of information literacy education. Specific research results are as follows:

Related theory

The methodologies surrounding information literacy education can be categorized into three key groups: behaviourist, constructivist and relational approaches. In the behaviorist approach the emphasis is on the learners’ behaviour and outcomes in terms of skills (Eisenberg and Berkowitz, 1990). The constructivist approach is based on the ideas and theories developed by the educational philosophers Bruner (1986), Vygostky (1962) and Kelly (1955). In this approach learning is characterised as a process of construction in which each learner develops

a new understanding on the basis of what she or he has already learnt (Kuhlthau, 1993). The relational approach, proposed by Bruce (1997), is a phenomenographic approach and is extensively employed by higher education sectors. It interprets learning as a process which brings individuals to understand the world differently, rather than a means aimed to retain information about the object of study (Bruce, 1997).

The meaning of information literacy

C.L. Al-Qallaf (2020) stated within the system of scholarly communication, graduate education encompasses research, the ability to critically analyse existing knowledge, and the acquisition and creation of new knowledge and skills. Accordingly, students enter graduate programs with varying degrees of academic skills, knowledge, and experiences, coming from different backgrounds across all disciplines. However, some of the core competencies,concepts, and knowledge essential for graduate-level coursework and research arewithin the purview of information literacy.

Zhang Hong (2019, p.86), since the information demands of “production” and “teaching” both come from disciplines and majors, the professional requirements of “integration of production and education” information literacy education are very high, and general information literacy education is often difficult to meet their professional needs. “Postgraduates are more eager for information literacy education to make them familiar with professional literature retrieval tools. Master the acquisition of professional literature, and provide practical guidance”.

Xiong Caifa (2009, p.183) explained that information literacy education is the education to cultivate information awareness and information processing ability, including the education to train students to understand information knowledge, identify information needs, retrieve information resources, analyze and evaluate information, make effective use of information, and comply with information ethics.

Zhou Beibei (2018, p.14) explained information literacy education is not only a pure education of information retrieval skills, but more important is to cultivate students’ ability to understand the modern information environment, adaptability,

consciousness, initiative, foresight and independence in using information, cultivate lifelong learning ability and innovation ability, screen information authenticity, maintain information security, and cultivate information ethics.

Wang Yu (2012, p.24) explained that information literacy is the ability to acquire, evaluate and use information, which is a new requirement for talent training objectives in the information age, and also an important indicator to evaluate the comprehensive quality of talents. He also pointed out that information literacy education aims at cultivating information awareness and the ability to acquire and utilize information. It is not a pure skill education, but a quality education that aims to cultivate students' knowledge structure to adapt to the information society and develop students' sustainable learning ability, innovation ability and critical thinking ability. Information literacy education is an important way to cultivate students' lifelong learning ability and create innovative talents.

To sum up, researchers believe that information literacy education refers to a comprehensive ability to effectively recognize, query, acquire, utilize, communicate and create information with critical thinking, and promote learning, research and innovation. Information literacy education is not a pure skill education, but a quality education to train students to have the knowledge structure to adapt to the information society, and to develop students' ability of sustainable learning, innovation and critical thinking.

The importance of information literacy education

Wu Hanhua, Guo Shujing (2022, p.102-110) The purpose of information literacy education is to cultivate students' ability to use information to think dialectically, establish correct social values, and help students effectively search, organize, use and evaluate information resources. Through information literacy education, students are able to adapt to the needs of social development in the way of lifelong independent learning.

Zhang Hong (2019, p.86) explained that the graduate education of "integration of industry and education" is a training mode combining applied talents, scientific research and advanced industries. During the study period, the graduate

should participate in industry-oriented scientific research, which is also phased. Scientific research at different stages of industrial development has different information needs, and the requirements for information ability are different in various links such as research topic selection, literature research, scientific experiments and results summary. Therefore, postgraduate information literacy education should provide different contents for different stages. The industry has high requirements for project advancement, technological innovation and scientific experiment. Information literacy education should train postgraduates' keen awareness and learning ability of new knowledge and new technology in the professional field, teach the method of judging the novelty and relevance of information in combination with the characteristics of the industry, introduce the application knowledge of professional foreign language retrieval tools, so as to facilitate postgraduates to solve practical problems in the professional field by using cutting-edge information and cutting-edge technology of the subject.

Li Yang (2007) pointed out that the goal of graduate education in colleges and universities is to cultivate high-level innovative talents, and scientific research ability is one of the core competencies that graduate students must possess. It is analyzed that the level of scientific research of postgraduates determines their information literacy to a large extent, and the degree thesis of postgraduates comprehensively reflects their information literacy level. It can be seen that information literacy education plays a fundamental role in graduate education, which is an essential part of graduate education.

Wang Yu (2012, p24) pointed out that the importance of information literacy education in postgraduate teaching and scientific research is reflected in the following aspects. Firstly, information literacy education is the key link of graduate education. It is believed that the cultivation of information awareness in information literacy education is the first step, which is gradually penetrated and strengthened in the process of education, and keen information awareness is crucial for graduate students. Second, information literacy education is an important means to improve learning quality. It is believed that information literacy education is the education of information retrieval,

analysis and utilization combined with professional characteristics, so that postgraduates can master retrieval knowledge, be familiar with retrieval tools, improve retrieval skills, obtain the most needed information resources at the fastest speed, and be able to accurately compare, analyze, identify and utilize information. Improve learning ability and efficiency, shorten the process of scientific research, improve the quality of learning. Thirdly, information literacy education is the main way to cultivate the ability of scientific research innovation. It is believed that information literacy education can cultivate the postgraduate students' good information sensitivity and rapid information processing ability, and help them better grasp the research status, key points, difficulties and trends in this research field, so as to promote academic development and theoretical innovation. Therefore, information literacy education is the main way to cultivate scientific research and innovation ability.

Tang Quan and Dou Jun (2017, p.137-144) pointed out that information literacy education is an important part of modern college students' education. As Bruce pointed out, guiding students to find information on demand and make proper use of the massive information in the open network or library can be regarded as one of the most important factors for the success of current education.

Saeid Baroutian (2016, p.16) stated technology and the amount of online information are experiencing phenomenal growth. Accordingly, the need for students to learn information literacy skills is greater than ever, in order for them to be successful during their study and after graduation. As students are required to know and be able to apply analytical and evaluative skills, information literacy education is essential: it enables students to become aware of what they have learnt and provides a means for reflection on their knowledge and learning process. In other words, information literacy education can transform the learning process into one that enables learners to engage in self-directed lifelong learning, beyond the formal educational process.

To sum up, researchers believe that the importance of information literacy education is mainly reflected in the following aspects: First, information literacy education plays an important role in the research and innovation ability of graduate

students. Including information acquisition ability, information evaluation ability, information utilization and innovation ability and information society responsibility. Second, information literacy education is an important means to improve the learning quality of postgraduates. Including information retrieval, analysis and utilization, so that postgraduate students master retrieval knowledge, can accurately compare, analyze, identify and use information, improve learning ability and efficiency, shorten the process of scientific research, improve the quality of learning. Third, information literacy education provides an effective way for the advancement and innovation of graduate subjects. Including timely understanding of the subject frontier dynamic, progress.

The connotation of information literacy

Yan Dan, Fan Yue (2021, p.96) pointed out that in the research on the construction of information literacy education system for the whole scientific research process of graduate students, it was mentioned that traditional information literacy education for scientific research often starts from the introduction and use training of library databases, but they do not know what keywords need to be retrieved during on-site demonstration and practical operation. The reason for this kind of problem lies in the failure to start from the initial link of the paper writing, that is, to identify the topic of the paper and the keywords needed to search. Therefore, it is necessary to integrate the content of information literacy education into the source of paper writing, and make full use of the retrieval of relevant literature information resources and the function of database research topic analysis in the process of topic selection, so as to ensure the scientific nature and value of the topic selection. On the basis of sufficient literature research, then carry out literature review writing. In this link, information literacy education should also be integrated, including the ways of direct and indirect quoting, especially the marking format and ways of quoted documents, which need to be focused on training.

The Ministry of Education issued Regulations for Libraries of Colleges and Universities (2015) proposed that “libraries should attach importance to the development of information literacy education, adopt modern educational

technology, strengthen the construction of information literacy curriculum system, improve and innovate the forms and contents of freshman training and special lectures." Information literacy education in university libraries is mainly used to cultivate students' information literacy ability, including information acquisition ability, information evaluation ability, information utilization and innovation ability, and information social responsibility. The training approaches include freshman entrance education, lecture training and literature retrieval courses.

Ding Yuan, Ma Wenfei, Han Fang (2019, p.24) mentioned that university libraries are academic institutions serving for personnel training and scientific research in schools, with educational functions and information service functions, and should attach importance to information quality education. Professor Deng Jingkang, deputy director of the College Cartographic Working Committee of the Ministry of Education and former curator of Tsinghua University Library, reviewed the process of the information literacy education development planning research carried out by the Information literacy Education Working Group of the College Cartographic Working Committee of the Ministry of Education in the last session, focusing on the core system composition of the information literacy education development planning.

Zhou Beibei (2018, p.14) taking Nanjing University of Science and Technology as an example, proposed the connotation of graduate literacy education in colleges and universities, emphasized that graduate information literacy education should include four aspects: information awareness, information knowledge, information ability and information morality, and investigated the information literacy education status of the research objects.

Gao Fogfei (2021, p.43) summarized the basic process of information literacy education, namely, based on information awareness, information knowledge and information ethics, through the determination, retrieval, acquisition, evaluation, management and application of information, solve the problems encountered and reconstruct their own knowledge system.

Han Lifeng, Qin Xiaoyan (2020, p.39) et al mentioned that according to the general logical process of information acquisition and utilization, the content of

information literacy education includes five aspects: “cultivation of information consciousness”, “cognition and selection of information sources”, “inquiry and acquisition of information”, “management and utilization of information” and “standardization and security of information utilization”. The specific content of each aspect fully reflects the characteristics of information literacy in the new environment and new development needs.

To sum up, the researchers believe that the connotation of information literacy education in China is diversified, and the content of information literacy education is mainly to educate people in information knowledge, information concept, information ability, information ethics and other aspects. The goal of information literacy education is to improve the information quality of the educated, and information literacy education is of great significance for the cultivation of innovative talents in colleges and universities. Among them, information demand and judging information value belong to the category of “information consciousness”. Mastering information tools belongs to the category of “information knowledge”; Obtaining information, using information to solve problems, spreading information and creating information belong to the category of “information capability”. There is also the category related to “information ethics and morality”. These four parts constitute the organism of the education structure of information literacy. Among them, information consciousness is in the leading position, information knowledge is the pre-foundation, information ability is the key requirement, and information ethics is the “guiding standard” or “regulator”.

3. The development strategy of information literacy education for postgraduates in universities

To formulate scientific and effective strategies for postgraduate information literacy education, firstly, it is necessary to identify the problems existing in the development of postgraduate information literacy education and the important direction of formulating effective strategies. On these two points, domestic and

foreign researchers have done a lot of research, which provides an effective reference for this paper. The specific research is as follows:

The problem background of developing strategies for information literacy education for postgraduates

The Ministry of Education of China (2018) formally proposed to realize the transformation from special resources to large resources in the Action Plan of Education Informatization 2.0. From improving students' application ability of information technology to improving information technology literacy; From application integration development, to innovation integration development transformation. To be specific:

(1) Change of technical literacy view. From technology application capacity to information literacy capacity, we should not only use technology, but also use information literacy and information technology cooperation.

(2) Change of educational technology view. Educational technology can not only stay in the learning environment, but should be embedded in the learning system.

(3) Change of development driving force view. In the past, we put a lot of emphasis on the application of the education system, and the impetus of innovation-driven development has not been fully reflected.

(4) Change of educational governance level. In the past, education governance was remedial, problems appeared first, then governance problems, did not emphasize the modernization of education governance.

(5) Change of thinking types and views. One of the problems facing education today is that the way of thinking is still stuck in the industrial age, and our type of thinking urgently needs to shift from instrumental thinking to artificial intelligence thinking.

The "Information Literacy Framework for Higher Education" (2015) issued by the American Association of University and Research Libraries (ACRL) regards information literacy education as an education reform movement. It changes the fixed list of learning effectiveness skills of the Standards and adopts a richer and

more complex set of core concepts to better realize the potential of education reform. However, the flexibility of the Framework also brings some confusion. It brings some challenges for information literacy educators to change the teaching content. In summary, the Framework promotes the content of information literacy education from skill-based teaching to teaching based on threshold concepts, changes different types and levels of information literacy education courses, and promotes the content of information literacy education to expand from the field of higher education to the field of social daily life.

Wang Zhenglu (2022, p.51) With the extensive application of information technology in the field of information literacy education, online information literacy education supported by information technology has become an important part of current information literacy education, especially in the period of epidemic, online information literacy education has achieved rapid development. However, it must be noted that the current online information literacy education still has some practical problems, such as insufficient contextualization and weak interaction, resulting in the education object's weak sense of presence and participation. At the same time, practical problems in offline information literacy education, such as low level of knowledge acquisition, lack of emotional stimulation and lack of mutual interaction, also lead to the difficulty of information literacy education to achieve ideal results. Therefore, to explore innovative nodes of information literacy education has become the key to carry out high-quality information literacy education practice.

Guo Jinchi (2021, p.9) With the increasing development of mobile Internet, the society has put forward higher requirements for the mobile information literacy of the new generation of college students as "digital natives", which requires university libraries to undertake the important mission of improving the mobile information literacy of college students. The "student-centered" MIL project and curriculum of the University of Waterloo, Canada, is committed to helping college students in the mobile Internet era to improve mobile information literacy, focusing on student learning, learning effects and student development, and establishing university cooperation teams, developing course-specific apps, and cultivating

students' abilities in information acquisition, evaluation, utilization and other aspects. The paper summarizes its content, process, characteristics and experience, and provides operable reference for promoting the development of mobile information literacy projects and courses in Chinese university libraries.

Huang Qinling (2021, p.6) proposed that with the continuous promotion of the "double first-class" strategy, internationalization has become the basic path to build world-class universities. In 2018, the Ministry of Education issued the notice "Standards for the Quality of Higher Education for International Students in China (Trial)", emphasizing that all localities and colleges should take the Standards as the criterion to improve the education work of overseas students in China, so as to realize the healthy and sustainable development of education work of overseas students in China. In this context, international students have undoubtedly become the important service objects of university libraries, and providing information literacy education for them is definitely the service content that libraries cannot ignore. At present, Chinese university libraries have carried out multi-level practice of information literacy education for international students, and initial results have been achieved in teacher team formation, teaching type and content exploration, teaching method innovation, teaching language diversity and other aspects, but there are still deficiencies in the degree of attention, practical depth, teaching teachers, teaching effects and other aspects of information literacy teaching for international students. In the future, faced with more complex and severe international teaching and talent training challenges, the university libraries in our country should make continuous progress in the long-term planning of international students' information literacy education, the construction of teachers, the improvement of the teaching librarian ability, the application of new teaching methods and so on. It adds new impetus to the cultivation of international students, scientific and technological innovation talents, internationalization construction and "double first-class" strategy.

Zhou Qiong (2021, p.128-131) proposed that information literacy has penetrated into daily life, enterprise development and social construction in an all-round way, and become the basis for sustainable social development. Colleges

and universities are the main battlefield of information literacy education. If graduate students master the information literacy skills in their studies, they can become lifelong information literacy people. At present, information literacy education in colleges and universities takes classroom teaching as its main form and information retrieval as its main teaching content. Open information content and diverse information needs of learners call for a new model of information literacy education, so that information literacy education can timely track academic frontier, in-depth learning, provide methods and tools, and improve learners' information literacy ability. On the whole, China focuses on the construction of information literacy education system, and explores the limits and functions that information literacy can achieve from various angles. Overseas students prefer to evaluate students' information literacy ability in specific practice, compare indicators and observe changes to demonstrate the effectiveness of the measures taken or the proposed education model. Both of them are limited in the framework of information literacy, lacking the integration of information literacy and other capacity building, and lacking the guidance of pedagogy theoretical framework. Of course, overseas qualitative and quantitative analysis of information literacy performance, taking writing as a breakthrough, strengthening the cooperation between teachers and librarians, and improving information literacy ability based on public acceptance are worthy of our reference when constructing a new model of information literacy education.

C.L. Al-Qallaf (2020) stated though it is common practice for undergraduate curricula to include some form of information literacy education, and today's students are assumed to be tech-savvy, there is no assurance that incoming graduate students are information literate or even possess some information literacy skills. Research has shown that graduate students bypass libraries, rely heavily on the Internet, and lack effective information research skills, leaving them totally unprepared for graduate coursework. In addition,faculty assume that graduate students have information and research capabilities whereas, for most of the students, this is not the case. Graduate students generally encounter challenges when adapting to new academic programs and systems, including the information

ecosystem. Educators and program developers need to consider that these students lack expertise and need guidance to navigate near-boundless information; they are not yet scholars and are only just embarking on their graduate studies with little information-seeking and research abilities.

Erfanmanesh, Abrizah, and Karim (2014) stated that increased awareness of the prevalence of information seeking anxiety construct among students would not only provide an opportunity for the concerned authorities in reducing anxiety among students but also help in preparing them as lifelong learners. It is the information literacy program by which information users are trained why, when, and how to use relevant and quality information effectively and help in reducing all types of academic anxiety. It would be difficult to provide need-based guidance to users without assessing the phenomena of information seeking anxiety among them.

Muhammad Asif Naveed (2016, p.80) states that students primarily seek help from other students, whether their peers or upperclassmen, rather than their tutors or library staff, whether for content and information search purposes. For whatever reason, the inability of supervisors to reach out to students is very surprising, as the connection between supervisors and students is the backbone of any research mission.

He Yanping (2019, p.82-83) showed that information literacy curriculum education has a significant effect on the improvement of students' information literacy ability through the comparative data of differences, and it plays a direct role in improving students' information literacy ability as a whole. However, in addition to requiring undergraduate students to open information literacy courses, domestic colleges and universities have no clear requirements and rigid regulations for postgraduates, and generally do not incorporate it into their graduate training programs. Therefore, this study believes that at the present stage, universities should strengthen the construction of library teachers and set up required courses of information literacy to meet the needs of postgraduate study and scientific research, so as to improve the popularization rate of information literacy education for postgraduate students.

Du Hong (2013, p.96) has the same basic requirements for information awareness, information ability and information ethics among the standards for information literacy requirements of graduate students and undergraduates. Compared with undergraduates, postgraduates have higher requirements for information literacy due to their direct participation in scientific research. They mainly focus on scientific research methods, professional information acquisition, evaluation and utilization, and academic ethics. Undergraduates focus on the cultivation of information awareness, information knowledge, basic information ability and information ethics, so that they can have basic information quality and ability, understand the role and value of information, have a sense of effective information, can accurately express information needs, and can properly use retrieval methods to obtain the required information and correctly evaluate and effectively use it.

Wang Ke (2022, p.93) proposed that as an important part of master education of physical education in China, graduate education of master education of physical education has the commonality of master education and the characteristics of physical education, and the cultivation of information literacy is equally important. However, due to the strong technical attributes of physical education and the congenital deficiency of educational rationality of postgraduates of physical education, the information literacy of postgraduates of physical education and its cultivation have not been paid due attention, which in practice also deeply affects the scientific research ability and innovation ability of postgraduates of physical education, and causes basic obstacles for the cultivation of doctoral postgraduates of physical education. In view of this, it is extremely urgent to cultivate the information literacy of master students of physical education in the new era.

Yan Dan (2021, p.97) puts forward that the cultivation and formation of academic and scientific research literacy is of vital importance for information literacy education for graduate students in universities, which is also what university libraries, as an important academic town, should focus on and carry out. At present, this kind of information literacy education is mostly organized by librarians to conduct training or teaching for students alone, which fails to be connected with the course work or

graduation thesis of the college, especially the lack of real topic selection needs and research tasks, and dissociates from the real academic situation. The feedback of learning effect is not only reflected in their information skills need to be strengthened, but also reflected in their lack of information concepts and abilities that match their own academic situations. As a result, they cannot smoothly solve the problems encountered in the process of scientific research and professional learning. At the same time, the traditional thematic lecture and embedded curriculum of scientific research information literacy education covers a lot of content but is relatively scattered, not systematic. The content of lectures usually involves only part of the thesis writing and scientific research workflow, which cannot cover the whole scientific research process. As a result, systematic training of thesis writing and scientific research process cannot be carried out comprehensively for postgraduates, and the effect of applying what is learned cannot be achieved. Therefore, it is necessary to explore the construction of postgraduate research information literacy education system that can cover and penetrate the whole process of thesis writing and research.

To sum up, the researcher believe that the problem background of developing strategies for information literacy education for postgraduates includes: lack of overall planning and coordination between secondary departments; lack of fund guarantee and lack of sharing of educational resources; the teaching form is single, and the teaching effect is difficult to guarantee; lack of teaching backbone, lack of scientific and sustainable teacher training system; educational concept is backward and curriculum content is monotonous;the evaluation is not targeted, and the supervision mechanism is not perfect.

The main direction of the development strategy of information literacy education for postgraduates

1. Development planning and administrative management

Zhang Hong (2019, p.90-91) stressed that engineering master training institutions should improve the scientific understanding of professional postgraduate education, give reasonable positioning to different types of postgraduate students,

and change the practice of professional postgraduate education imitating academic postgraduate education. The Office of Academic Affairs, the Office of Science and Technology, and the Office of Graduate students should study the changes of the industry, keep up with the development of the industry, understand the trends of the industry, listen to the suggestions of industry experts, fully consider the characteristics of master of engineering education in the aspects of training objectives, class arrangements, teaching content and methods, the construction of internship room and practice base, and improve the ability of information literacy education to serve the industry.

He Yanping (2019, p.82-83) proposed that embedded information literacy education is a new model of information literacy education, which takes student needs as the main body and integrates information literacy education content into professional course teaching, paper writing and scientific research team activities. Through cooperation with professional course teachers and graduate tutors, students can develop information literacy. Master the basic knowledge of professional courses, improve the ability of scientific research and innovation. At present, this teaching mode has become mature from theory to practice in foreign countries. In practice, it has become the first choice of information quality education mode in foreign university libraries. In China, through years of research and exploration has also entered a stage of gradual development. Embedded information literacy education mode emphasizes the cultivation of students' information literacy skills to improve their professional knowledge and scientific research and innovation ability, which is highly targeted and very suitable for the development of information literacy education for postgraduates. Subject librarians have years of experience in serving academic departments and stable network resources. Most subject librarians not only possess high professional literacy of library and information, but also have certain professional background of subject. Libraries should give full play to the advantages of subject librarians and encourage them to cooperate with professional course teachers and graduate tutors of the school. The teaching service that integrates information literacy education into postgraduate professional learning and

runs through the whole scientific research process is taken as an important means to improve postgraduate information literacy and research creativity.

Karmen Stopar (2019, p.479) stated research field of digital competences (also referred to as competencies), computer skills and information literacy is strongly connected with education, computers, information science and libraries. This is reflected in the mapping of papers in this field to the broader classification area of Education and Educational Research in the citation database Web of Science as well as Information Science and Library Science and Computer Science. Publications in these research areas are principal contributors of published research outcomes. However, co-operation and co-citation between different research groups, as reflected by the respective research areas, seems rather weak. Researchers remain confined in their particular professional and educational expertise without sufficient awareness of related research conducted in other areas. The scatter of research across the different areas and publications needs to be elucidated in order to show potentials for possible future synergy.

Muhammad Asif Naveed (2016, p.80) suggested the need for training of students in information seeking skills so that they might be able to find need-based and relevant information independently, efficiently, and effectively. This study recommends the establishment of a separate “information skills department” within academic libraries responsible for developing information skills of research students in particular and other students in general.

Maria Pinto (2020) underlined concerning possible MoIL contents, uncovered six thematic clusters, which should be basic components of its future conceptual framework: IL and e-learning, Mobile devices and competencies, Ethics,Library and eresources, Educational technology, and Technological environment. At the same time, these components represent the research trends within this sub-domain. Ultimately, MoIL involves competency in each of these six trends, which together may contribute to making-up a coherent conceptual framework.

Charlene L. Al-Qallaf (2020) Stated while information literacy in undergraduate programs has received considerable attention, few studies have explored graduate programs. So aimed to assess the information literacy skills and knowledge of

incoming students in an information studies graduate program at Kuwait University. By assessing students before and after they receive information literacy instruction, the study also aims to map a plan for developing graduate-level information literacy education. The study's rationale is to provide empirical evidence of graduate students' information literacy and research capabilities on commencing their studies, which are expected to be low, thereby encouraging educators and policymakers to engage in meaningful, informed discourse on investing in information literacy education.

In the Action Plan for Education Informatization 2.0 (2018), the Ministry of Education of China emphasized that the Ministry of Education should focus on formulating macro-policies, strengthen work guidance and formulate standards and norms according to the needs of education reform and development at all levels and of all types and in different regions. Local administrative departments of education at all levels should further improve the leading system of education informatization work, integrate the strength of professional institutions of education system, make full use of the advantages of professional services of relevant enterprises, and explore and establish a convenient and efficient support mechanism of education informatization technology service. Schools at all levels and of all types should generally implement the system that school leaders serve as chief information officer (CIO), specify responsible departments, and comprehensively coordinate the planning and development of informatization of the school. All localities regard educational informatization as an important indicator and incorporate it into their own educational modernization indicator system. We will comprehensively carry out supervision, evaluation and third-party evaluation of regional education informatization, and improve the efficiency, effectiveness and benefits of education informatization development in all regions and schools at all levels.

Li Jun (2022, p.89) proposed that the development strategy of information literacy education could be incorporated into the short , medium and long-term development plans of universities by learning from the practice of British universities,

so that information literacy education could be fully integrated into the training programs of all majors of the university and run through students' entire university career. At the same time, schools should adopt relevant documents, policies and measures in accordance with changes in environment and conditions to ensure that the development strategy of information literacy education can be implemented to ensure that all students have the opportunity to acquire these important lifelong independent learning skills.

Xiao Xinxiang (2021, p.120) proposed that postgraduate information literacy education should strengthen systematic planning, as follows: (1)strengthen government overall planning. The development of information literacy education cannot be separated from government support. Britain established the Joint Information Systems Committee (JISC), Specifically responsible for information and network services activities, but also the formulation of related policies. It is suggested to set up similar institutions to provide organizational guarantee for the cultivation of college students' information literacy. (2) Promote theoretical research. Observing the practice of European and American countries, we find that they all attach importance to the theoretical research of information literacy. Taking the United States as an example, the research and development of a complete set of theoretical system, always occupy the trendsetter position. Our country should speed up the research of information literacy cultivation theory and put forward a perfect development plan for information literacy cultivation. (3) To construct the information literacy standards for higher education in our country. European and American countries have been trying to introduce various information literacy standards, not only to serve their own information literacy education and research, but also to enhance the international discourse power. In view of this, it is necessary for China to accelerate the formulation of a unified standard of information literacy ability, promote the establishment and implementation of the information literacy evaluation system of Chinese citizens, and carry out activities such as the "national information plan". At the same time, local governments and universities should also adapt to local conditions, take the initiative to adapt to technological changes such as big data, cloud computing and artificial intelligence, and formulate

standards suitable for their own development according to the national standards of information literacy.

2. Form of education

Zhang Hong (2019, p.90-91) proposed that embedded teaching and tracking teaching are two effective teaching forms of "production-education integration" information literacy education. The information literacy teachers should enter the professional teaching classroom, the professional teaching should implement the resource-based teaching, and the information literacy should be infiltrated into the professional curriculum objectives of the graduate students. The teachers of the two aspects should cooperate comprehensively and deeply. According to the information needs of teachers and students of a specialized course of engineering discipline, personalized information literacy teaching content is customized to concentrate on teaching information knowledge required by students in the form of embedding in specialized courses. For example, the teacher of "Special Topic in the Field of Control Engineering" expects students to master the information types related to control engineering. The school's information literacy teaching team focuses on the characteristics of resource types such as patent literature, engineering standards, scientific and technological reports and product samples in the embedded professional courses according to the practical information needs of the latest technology, engineering norms and product standards concerned by engineering masters. The choice of information demand and information type, the matching relationship between information demand and information retrieval characteristics.

He Yanping (2019, p.82-83) proposed that peer education refers to an active form of education in which a group of people with similar characteristics share, transmit and grant effective knowledge to each other in a specific environment. Peer influence is widely accepted in higher education. University libraries introduce peer education into postgraduate information literacy education, attach importance to peer power, and carry out peer consultation, peer training and peer influence have positive significance for the improvement of postgraduate information literacy ability and scientific research innovation ability. The library can select a group of graduate

students who have strong interest in scientific research and volunteer to serve as peer educators by means of voluntary registration and recommendation by tutors, etc., with each scientific research team of the school as the unit, and the subject librarian team will provide them with centralized training first. After passing the strict assessment, the peer educator undertakes the task of training and guiding the information literacy education of the students in the research team on a regular basis. Meanwhile, the subject librarian keeps contact and communication with the peer educator and timely helps them solve the problems they encounter in study and research.

Saeid Baroutian (2016, p.22) showed that providing a approach to the workshop was critical for enabling the students to identify discipline relevant databases, keywords and search terms, and for evaluating information and citing the resources according to the standards and guidelines.Additionally, the students' level of confidence was significantly increased after participating in the workshop. Indicated that the students' level of confidence was significantly increased after participating in the workshop need to support international postgraduate students' transition, learning and practice through well-developed information literacy training, is key to their success in the course. And recommended that information literacy should be adopted and integrated into the curriculum of all postgraduate qualifications as a core workshop.

Huang Lixia (2021, p.85) proposed that most postgraduate information literacy teaching models tend to ignore the confusion of students in learning, and more emphasis should be placed on their mastery of the characteristics and rules of their own learning. The dominant flipped classroom and MOOC expand students' "learning" space and reduce teachers' "teaching" time, which can promote students' learning enthusiasm. However, these two teaching modes do not pay attention to the process of students' thinking and judgment, such as the technology and rules that students need to master in information ethics. In the future, information literacy education should clarify the main position of graduate students, emphasize their sense of participation in the courses of information literacy education, cultivate their ability of information

analysis, information processing and problem solving, promote their critical thinking and innovation ability, and make information literacy ability become one of the main abilities of lifelong learning for graduate students. Therefore, strengthening the training of students' learning mode and thinking mode should become one of the themes of information literacy education for postgraduates in the future. On the other hand, the rise of online education model makes up for the deficiencies of offline education model, and the combination of the two models can create diversified information literacy education models. For example, teachers can make use of emerging technologies such as micro-videos and micro-blogs to increase the interest and diversity of information literacy classes.

Yan Dan (2021, p.103) summarized the experience of postgraduate research information literacy education after years of practice and exploration: (1) To realize the systematic teaching of scientific research information literacy, it must rely on a complete course. The course leader or the teaching teacher team can plan and design the course as a whole according to the links of the whole scientific research process, while the forms of special lectures and scattered workshops cannot meet the requirements of systematization. (2) Scientific research information literacy education must rely on real scientific research needs and academic environment, and carry out practical training and exercise of literacy ability in various processes driven by realistic thesis writing tasks. Without task-driven explanation, it cannot play a role in the training of scientific research ability. Based on such real needs and tasks, students can effectively practice information literacy in the process of scientific research, and finally complete the writing of their papers, so as to achieve the purpose of killing two stones with one stone, which can not only stimulate enthusiasm, but also produce academic results. (3) In terms of classroom teaching methods, flipped classroom teaching can be adopted. Students are invited to report and communicate in the following aspects on the basis of completing a literature review independently: the reason, background and significance of the topic; The process of literature research; The process of literature review writing; Literature citation specification, showing how to scale references in literature review, and indexing format. Through such systematic training, the practical scientific research quality and paper

writing ability of postgraduates are cultivated, so as to apply various information literacy skills in practical training.

Li Jun (2022, p.89-90) proposed the construction of networked teaching organization forms. In order to ensure that information literacy education is effective for all types and levels of personnel, teaching must adopt diversified forms of organization, such as classroom teaching, training courses, seminars, one-to-one or one-to-many face-to-face guidance, online real-time interactive communication, FAQ and other forms. At the same time, it makes full use of information technology and hyperlink technology to connect related and similar teaching contents, so that different organizational forms of different teaching contents can be organically connected to form networked teaching organizational forms. It is also possible to establish an information literacy education and training database to serve all readers through the network 24/7.

Xu Wenjing (2022, p.110) referring to the international experience in information literacy education, proposed that in terms of education methods, domestic information literacy educators should start from several aspects: (1) The "knowledge practice" concerned with cognition and the "intentional indicators" concerned with emotion in the Framework should be studied. In teaching, we should not only pay attention to improving students' cognition, but also stimulate students' learning from emotion. Therefore, in addition to the traditional resource-based learning, the teaching strategy of visualized educational stories and vignettes can be adopted to inspire students to think, imagine and participate. (2) We should deeply understand the concept of meta-literacy in the Framework, explore the matching practice model of service study in teaching, advocate social practice through service study, and comprehensively improve the information literacy ability and thinking in the authenticity task; (3) We should study the metacognition emphasized in the Framework, namely critical reflection, explore reflective practice, carry out self-reflective information literacy education, identify obstacles or tacit knowledge in the process of information literacy practice, and improve thinking ability and threshold concepts; (4) We should attach importance to the threshold concept of

“research is inquiry” in the Framework, reasonably design research questions and guide inquiry-based learning.

3. Resource input guarantee

He Yanping (2019, p.82-83) pointed out that with the development of educational informatization and the growing maturity of digital learning environment, the forms of information literacy education in libraries have also been diversified. The emergence of recorded and played video classes, MOOC online courses and micro-videos has become a beneficial supplement to traditional classroom teaching. The extensive development and application of new media has also profoundly changed readers’ habits of using university libraries and provided an opportunity for library information literacy education. On the one hand, the library should systematically collect and sort out the existing high-quality course resources, including micro-videos and online courses developed by database providers. Through various publicity channels and media communication methods such as QQ, wechat and Weibo, the library should let the graduate students know and get familiar with them and choose their own learning content independently, so as to meet the personalized needs of graduate students’ information literacy. On the other hand, the existing library network online course resources are mainly general courses, and the learning objects are mostly undergraduates. For postgraduates, the course content lacks a certain depth and breadth. Libraries should strengthen the construction of online courses and micro-courses on information literacy for postgraduates, so as to create more conditions and ways for postgraduates to improve their own information literacy ability through independent learning.

Muhammad Asif Naveed (2016, p.80) stated the usability of online information resources as university libraries invest huge sums of money for annual subscriptions of online databases. If there was no optimum use of online resources due to information seeking anxiety, it might lead to wastage of precious and scarce resources.

Kenchakkanavar (2014) explained due to the increasing digitalization of information, libraries are being transformed into-digital libraries. Traditional resources are complemented by e-resources, which facilitate and modify the way users use libraries. Thus, the awareness of the importance of digital literacy becomes essential in

order to access information and acquire information resources, in the new digital libraries.

Bowers and Kumar (2015, p.27) stated tutorials, promotional videos and various electronic resources become the most immediate reality of the teaching learning processes, especially in the realm of higher education. The generalization of eresources, an unstoppable and innate reality of today's generations, offers numerous advantages to students such as convenience, flexibility and access to education.

Wang Zhenglu (2022, p.53) proposed to build an intelligent information literacy education environment empowered by the meta-universe based on technology. (1) Artificial intelligence digital twin technology. Making full use of artificial intelligence digital twinning technology can realize the dynamic growth of metacomverse resources. First, long-term sustained intelligent utilization can produce a large amount of content, which can realize the dynamic growth of metacomverse resources. Second, personalized learning resources generated according to the individual needs of information literacy education objects can realize the dynamic and accurate transportation of meta-universe resources. Thirdly, the safety of the education environment of information literacy enabled by meta-universe technology can be ensured through all-round intelligent examination. (2) Big data processing technology. The establishment of the meta-universe resource allocation service system supported by advanced cloud computing intelligent technology can not only realize the intelligent virtualization of the hardware of the meta-universe enabling information literacy education system, but also promote the intelligent transformation of the information literacy education system. In addition, the cloud technology of big data processing can realize the seamless connection between data in the meta-universe and provide precise personalized services for the objects of information literacy education. (3) Blockchain technology. Due to the characteristics of blockchain, such as traceability, tamper-proof and de-centralization, the technology can transform from information-oriented to value-oriented, and form an information literacy education certification system that matches intelligent

information literacy education. In terms of the construction of information literacy education resources, blockchain technology is extremely beneficial to the search, storage, transmission and management of information literacy education resources and the formation of an ecosystem, which can realize the optimal allocation of information literacy education resources. In addition, blockchain technology plays an important role in the efficient intelligent authentication of information literacy education, such as credits, abilities and successes of information literacy education objects.

Li Jun (2022, p.90) proposed that multi-subject cooperation should be strengthened to gather superior resources of information literacy education. The experience of British universities shows that it is difficult for libraries to complete information literacy education independently when the teaching content of information literacy education is far beyond the range of traditional library skills and modern information technology should be fully utilized in teaching. At the same time, information literacy education also needs to be closely combined with professional courses to achieve better results. Therefore, in the process of information literacy education, university libraries first need to communicate with school leaders and teaching management departments to obtain their support and help in terms of policies, teachers, funds, class hours and so on. Secondly, we should strengthen the cooperation with professional teachers and curriculum designers of secondary colleges in the university, strengthen the organic integration of information literacy education and professional subject education, and improve the quality and effect of information literacy education. Third, strengthen in-depth cooperation with educational technology service departments and information technology personnel of schools, develop and design effective information literacy education platforms and systems, and improve the breadth, depth and individuation of information literacy education; Fourth, to deepen the long-term and stable strategic partnership with excellent teachers of disciplines and professional and third-party information service organizations for information literacy education, so as to cope with the challenges of expanding the scope of information literacy education

and the shortage of library teachers. In short, university libraries must strengthen the cooperation with all relevant subjects of information literacy education and aggregate relevant superior resources, so as to promote the smooth progress of information literacy education.

Xiao Xinxiang (2021, p.121) proposed to create a good environment for information literacy education, create a suitable software and hardware environment for information literacy education, fully integrate the resources of library, network center and modern education technology center, build an information support service center, and provide teachers with new teaching technology skills training, curriculum construction support services, and wisdom research support services. To provide students with more unobstructed and convenient access to information and ways. University libraries should give full play to the advantages of information resource inquiry, information network and talents to serve students' information literacy education. The network center should provide adequate network services to ensure smooth, convenient, and secure networks. The modern education technology center should accelerate the pace of education informatization in the whole school, and realize the maximum use of teaching software and hardware resources through the construction of smart campus, especially the design, development, utilization, evaluation and management of information resources. At the same time, more investment will be made to build more and better smart classrooms with advanced facilities and complete functions, as well as multimedia online classrooms, so as to provide students with a diverse information learning environment. In addition, students should be encouraged to standardize their online behavior and social forces should be mobilized to create a safe school Internet environment.

4. Construction of teaching staff

The Ministry of Education of China (2018) emphasized the promotion of teachers' information literacy in the Education Informatization 2.0 Action Plan. It has implemented the "Opinions of the CPC Central Committee and The State Council on Comprehensively Deepening the Reform of the Construction of Teachers in the New Era", encouraged teachers to actively adapt to new technological changes such as

information technology and artificial intelligence, and actively and effectively carry out education and teaching. The “AI + Teacher Team Building Action” has been launched to promote the new path of AI supporting teacher governance, teacher education, education and teaching, and targeted poverty alleviation, and to push teachers to update their concepts, reshape their roles, improve their literacy and enhance their abilities. We will innovate the training program of normal university students, improve the curriculum system of normal education, strengthen the cultivation of information literacy and information-based teaching ability of normal university students, and continue to carry out the information-based teaching ability enhancement training of teachers in vocational colleges and universities. We will carry out information-based leadership training for principals, and comprehensively improve the information literacy of school administrators at all levels.

Zhang Hong (2019, p.90-91) proposed that postgraduate education for engineering degrees mainly focuses on the application of theory and technology, and the purpose of education is to train students to solve practical problems with the knowledge they have learned and emphasize effectiveness. Case teaching is exactly a bridge between theory and practice. The master of engineering implements the double tutor system, and the teachers are a diverse teaching team. Among them, the enterprise tutors come from the professional field and have rich practical and management experience. Most of them are based on case teaching. Teachers of information literacy course work closely with enterprise tutors, and select the cases of enterprise tutors from the front line to implement information literacy teaching.

Xiao Xinxiang (2021, p.120) proposed to strengthen the construction of teachers in information literacy education. In addition to mastering modern educational ideas and skillfully using modern teaching methods and means, an excellent modern teacher must also be a solver of pioneering and cooperative problems in the technology-enabled ecology, including the teaching practice and experience of new technology. It also includes theories on the integration of technology and education and teaching, such as learning scaffolding, STEM education, human-machine collaboration, etc. However, in view of the current actual situation,

the level of teachers engaged in information literacy education in colleges and universities is uneven, and the source is relatively single, so the effect of information literacy education is worrying. It is suggested to plan the construction of teachers for information literacy education from the overall level, speed up the establishment of a teacher team composed of subject professional teachers, information center or library professionals, and carry out regular professional quality training to comprehensively improve their information literacy, so as to provide guarantee for the cultivation of students' information literacy.

Consuelo Garcia (2020, p.1) stated previous experience and practice of this skill differs remarkably between freshmen. This combination of deficiencies and weaknesses requires teachers to invest resources and time on information skills instruction. Our aim is to provide a test to assess substantial students' information problem-solving skills in educational sciences, to provide a test to assess substantial students' information problem- Solving skills in Educational Sciences, in order to focus their subsequent training in a much-tailored way.

Taylor (2012) explained albeit information specialists and librarians have been traditionally responsible for training in these skills, students still show difficulties when evaluating information suitably, especially in the light of the specificity of knowledge and the necessary use of specialized databases. This has led professionals from other academic fields (i.e, medicine, psychology, or engineering) to develop instructional approaches in order to convey this skill in a much more specific way.

Andrej Sorgo (2016) concluded that self-learned and generic skills attributed to digital natives do not lead to sufficient proficiency in information literacy in higher education. Therefore, in order to increase IL, the successful completion of student assignments should go beyond Googling and copy-paste procedures, and should include a broad spectrum of IL competencies and skills. Only in this way will it promote higher cognitive levels of thinking and more systematic learning. And indicated that digital natives are not necessarily information literate, and that their daily ICT activities only marginally correlate with course work leading to the advancement of academic and professional competencies. The "common

knowledge" is that instruction should be tailored to the skills of existing digital natives. We can agree that digital natives need different forms of instruction but not in a different direction, at least not at the university and college levels, where higher level digital skills are expected.

Abusin and Zainab (2010, p.71) conclude that If the student cannot find what he is looking for he would feel depressed and sad for the time and effort wasted. Understanding information seeking anxiety among information seekers is essential in designing and developing need-based contents for information literacy curricula. Exploration of the feelings and emotions of postgraduate students with regard to searching information and how these feelings affect their academic performance will generate useful knowledge for developing need-based information literacy programmes.

Sandy Zinn (2016, p.34) expained the onus rests on the classroom teacher. This study sought to answer the following questions:

(1) How do teachers understand information literacy and information literacy education?

(2) How do teachers make their information literacy explicit in the classroom?

(3) At what level are teachers' web knowledge and skills?

The value of this qualitative research lies in the illuminate insights it offers about the phenomenon of information literacy education as perceived through teachers' journals in the context of the Western Cape Province, South Africa.

International Federation of Library Associations and Institutions (2015, 54) underlined an inquiry-based approach to learning and teaching emphasizes thinking about information and using information within a problem-solving perspective and that integrates the knowledge of tools, sources, and search strategies within the teaching of thinking and problem solving.

Yan Dan (2021, p.103) proposed that it is necessary to further improve the strength of the teaching team in information literacy education, especially to improve the scientific research ability and academic level of teachers, which is crucial to complete the teaching of courses. If teachers themselves are not familiar with the

rules and procedures of scientific research, have no deep understanding of all aspects of academic activities, and have no personal experience and experience in thesis writing and academic research, they cannot impart the information literacy contained in it to students. Therefore, training teachers with high scientific research ability is the most important basis for carrying out this education.

5. Education content construction

The Ministry of Education of China (2018) emphasized the cultivation of students' information literacy in the Action Plan of Education Informatization 2.0. Strengthen the cultivation of information technology knowledge, skills, application ability, information awareness, information ethics and other aspects of the integration of students in and out of class, and bring students' information literacy into the evaluation of students' comprehensive quality. We will improve curriculum plans and standards, and enrich the content of artificial intelligence and programming courses that meet the needs of the development of the information age and the intelligent age. We will continue to organize all kinds of application communication and promotion activities, innovate the content and form of activities, and comprehensively improve students' information literacy.

Yan Dan (2021, p.103) starting from the perspective of studying the life cycle and the whole process of thesis writing, starts from the retrieval and investigation of literature resources, the selection and utilization of scientific research tools, the standards and formats of academic norms, the review and process of paper submission and other aspects, and integrates relevant information literacy ability training into each process of postgraduate thesis writing. In addition, it discusses in detail the teaching contents of specific information literacy that can be cultivated among them, and constructs a comprehensive and complete systematic information literacy education system for graduate students in scientific research, so as to break the traditional fragmented information literacy education mode, cultivate students' multi-dimensional information selection, application and transformation ability, and truly enable students to apply what they have learned to the whole process of paper writing and scientific research. Make positive contribution to the reform and

transformation development of information literacy education in colleges and universities.

Zhang Hong (2019, p.90-91) taking “the Development trend of ceramic core Technology” as the case, proposed that the teacher should first search the patents applied by ceramic manufacturers through patent literature and dig the detailed description of the latest core technology from the patent specification. Secondly, the cutting-edge information of ceramic core technology research is retrieved through scientific and technological literature database. Considering the future information environment of engineering masters, the case teaching not only introduces the patent resources and literature database purchased by the library, but also specifically explains the free information resources related to the case and their retrieval methods, retrieval approaches, and analysis of search results. At the same time, it is emphasized that information literacy teachers should also introduce national authoritative information resources to students in detail, such as National Economic information website, National Bureau of Statistics website, National Research website, Zhonghong website, Zhongeconomic website, etc. Follow up the practical projects of master of engineering, and carry out information literacy teaching and information consulting services around the project process.

He Yanping (2019, p.82-83) proposed that the curriculum setting of postgraduate information literacy should be based on study and scientific research, meet the needs of postgraduate students in the whole process from research topic selection to paper writing, and expand the depth and breadth of teaching content. Comprehensive, professional and systematic education focuses on scientific research methods, the implementation of advanced retrieval strategies, the evaluation, selection and acquisition of professional information, the evaluation and analysis of retrieval tools, the cultivation of personal information management ability, the cultivation of academic ethics and norms, and data literacy. At the same time, strengthen the cooperation with tutors and functional departments to establish a sound course assessment and evaluation mechanism.

Li Jun (2022, p.89) proposed to expand the scope of teaching content and dynamically adjust teaching knowledge points with The Times. First of all, based on the development of The Times and user needs, adjust and design the corresponding teaching content. The content of information literacy education in British universities is very extensive, involving all aspects of readers' study, work and life, and its scope is far beyond the traditional use of library skills. In China, the University of Chinese Academy of Sciences also put forward the transformation from information literacy education to universal information literacy education, and carried out the corresponding practice. Therefore, our information literacy education can no longer be confined to the traditional teaching content, we must expand the teaching scope, adjust and design the corresponding teaching content according to the development and needs of The Times. Specifically, it can be based on the recommended teaching contents in relevant information literacy education frameworks or standards at home and abroad, as well as the teaching contents of information literacy education in universities at home and abroad, especially the curriculum framework proposed in the Global Media and Information Literacy Assessment Framework of UNESCO. As well as the teaching contents suggested in the Guiding Opinions on Further Strengthening Information Literacy Education in Colleges and Universities, and combined with the specific situation of the university, we will design and plan the teaching contents suitable for the characteristics of the university, the development of The Times and the needs of users. At the same time, it is emphasized that the content of postgraduate information literacy education should closely conform to the requirements of The Times, dynamically adjust the teaching content with The Times, fit the progress of users' teaching and scientific research, and make information literacy education deeply embedded in users' learning career planning. The practice of British universities shows that with the deepening of social informatization, data literacy, digital literacy and new media literacy will play an increasingly important role in People's Daily work, study and life. Therefore, the teaching content of information literacy education in Chinese colleges and universities must adjust the corresponding knowledge points in time according to the

changes and needs of The Times. The specific information can be based on the practical needs of social work, study and life, or refer to the relevant activities of relevant international and domestic associations and organizations, such as the media organized by UNESCO every year. And the content of information literacy week activities, timely increase or adjust the teaching content to meet the needs of readers.

6. evaluation and optimization of educational quality.

The Ministry of Education of China (2018) emphasized the development of the evaluation index system of students' information literacy in the Action Plan of Education Informatization 2.0. It organizes to carry out evaluation studies of student information literacy, and sets up an evaluation index system and evaluation models of student information literacy that are scientific, suitable to the situation of our country, and maneuverable. Through scientific and systematic continuous assessment, we can master the development of Chinese students' information literacy, which lays a foundation for promoting the improvement of information literacy.

Zhang Hong (2019, p.90-91) proposed that the industry is the direct employer and has the best understanding of the talent situation. The industry has the most important say whether the professional degree is suitable for the social and economic development. Whether the information knowledge and ability of engineering masters can adapt to the development of the industry completely depends on whether they can solve the problems encountered in the construction of production facilities, product design and development, operation and sales, and enterprise management. Industry is the main body to evaluate the success of information literacy education of "integration of industry and education", so it is very important to ensure the industry's right to speak. The introduction of market mechanism to evaluate the educational quality of "production-education integration"is conducive to the vigorous development of professional postgraduate education.

Huang Lixia (2021, p.86) Establish and improve the information literacy evaluation mechanism. The evaluation system of information literacy of graduate students should be different from that of undergraduate students, and the information literacy should be quantitatively subdivided into more details, and different evaluation criteria should be established for different stages of information literacy. The establishment of information literacy rating mechanism is directly related to the comprehensive utilization, development, innovation, dissemination and sharing of information resources of graduate students, and ultimately directly related to the ability of research and innovation of graduate students. The establishment of hierarchical evaluation system can control the learning group in every link of information literacy, and personalized information literacy evaluation system is closely related to the improvement of information literacy ability. The author believes that in the establishment of information literacy evaluation system, we should attach importance to the individualized development of graduate students and emphasize the development and change of individual information literacy. In the future research, enough attention should be paid to the information literacy evaluation mechanism, so as to further improve the development of information literacy education for graduate students.

Xu Wenjing (2022, p.108-109) proposed that apart from the content and form of information literacy education, the ACRL Framework also influenced the evaluation of information literacy education in higher education. There are two trends in the reform of educational evaluation: (1) the change from quantitative evaluation to qualitative evaluation or the organic combination of the two. Quantitative evaluation refers to the evaluation made by quantitative calculation method. Usually, data is collected first, and then certain mathematical methods or mathematical models are used for statistical evaluation. Qualitative evaluation refers to the value judgment made by qualitative description and interpretation rather than quantitative calculation. Examples include: research journals, reflective writing, “speaking your mind”, self-or peer evaluations, research drafts or papers, open-ended question responses, bibliographies, reports, posters, performances,

portfolios, worksheets, and concept maps. (2) Transfer from terminal evaluation to formative evaluation or organic combination of both. Final evaluation, also known as result evaluation, refers to the evaluation of the degree of realization of the whole teaching goal after a relatively complete teaching stage. Formative evaluation, also known as process evaluation, is an evaluation of students' learning results and teachers' teaching effects in order to guide the teaching process to move forward correctly and perfectly.

Xiao Xinxiang (2021, p.120) proposed that the current information literacy education training mode should accelerate the reform. First of all, information literacy education in the new era should be accurately positioned. Information literacy is already a kind of comprehensive literacy, and information literacy education is a kind of comprehensive education. An isolated and separated training system is bound to be difficult to cultivate students' information literacy, so it is necessary to reform the traditional teaching model and make unified arrangements for relevant teaching content, teaching system and practice links. Secondly, the curriculum construction of information literacy should be strengthened. Information literacy curriculum is an effective means of information literacy education. It is suggested that the curriculum related to information literacy should be included in the teaching syllabus at the national level. At the level of each university, the reform of the existing curriculum should be promoted according to the actual situation of the school, and special courses of information literacy should be set up. Finally, it is necessary to realize the organic integration of information literacy education in subject professional education. In its Position Paper on Information Skills in Higher Education, the UK proposed that "the integration of subject courses and information skills training" should be the first principle to judge the success of information literacy education practice projects in universities. We should put the spirit and intention of information literacy through the whole process of teaching activities and embody it into the curriculum system of relevant disciplines, optimize the information transmission of classroom teaching, and then really improve the information ability and level of students.

To sum up, the researchers believe that the development strategy of postgraduate information literacy education should be developed from the following aspects: Improve the development plan of information literacy education for postgraduates by applying modern higher education management science, Innovative the mode of information literacy education for postgraduates, Strengthen resource input guarantee in multiple aspects, Strengthen the construction of teachers for information literacy education, Enrich the content construction of information literacy education for postgraduates, Strengthen quality supervision and rectification of information literacy education for postgraduates.

4. Deficiencies in the theoretical research

Through the analysis of domestic and foreign postgraduate information literacy education research literature in the past ten years, it is found that postgraduate information literacy education research exposes the characteristics of insufficient research innovation, vague positioning of educational objects, relatively single research dimensions, and limited and traditional research methods.

Insufficient research and innovation of connotation, unable to meet the new requirements of talent training

In the Framework for Information Literacy for Higher Education formulated by the Association of College and Research Libraries (ACRL) in 2015, the beginning of the Framework for Information Literacy for Higher Education clarified a basic framework for the construction of information literacy. The idea that information literacy's potential as an education reform movement can only be fully realized if "a richer and more complex set of core ideas is implemented". After more than ten years of exploration and research, ACRL updated the information literacy standards into the information literacy framework, aiming to show that with the changing conditions of the times, information literacy is not a set of fixed standards, but an open concept. Through the construction of core concepts, we can continuously guide and promote the implementation of this educational reform. Compared with undergraduates, there is a lack of research on information literacy education for postgraduates. Only a

few literatures define information literacy education for postgraduates in different periods. On the one hand, the reason is that with the improvement of the external environment on the training level of postgraduates. On the other hand, it changes with the change of the connotation of information literacy education for undergraduates. Zhang Hong (2019) discussed information literacy education for engineering masters based on the concept of “integration of production and education”, and proposed that since the information needs of “production” and “teaching” both come from disciplines and majors, the information literacy education of integration is professional The requirements are very high, and general information literacy education is often difficult to meet their professional needs. Postgraduates are more eager for information literacy education to familiarize them with professional literature retrieval tools, master the acquisition of professional literature, and provide relevant guidance with strong practicality. In the past three years, although the development of higher education has entered a new stage and the management concept of higher education has also undergone significant changes, the connotation research on information literacy education for postgraduates has not been updated and progressed, and it is urgent for the higher education community and the library and information industry to pay continuous attention.

The positioning of research objects is not accurate enough, and the unique attributes of postgraduates are not fully explored

Postgraduate education plays an important role in cultivating innovative talents, improving innovation ability, serving economic and social development, and promoting the modernization of national governance system and governance capacity. At the 2020 National Postgraduate Education Conference, Sun Chunlan, member of the Political Bureau of the CPC Central Committee and Vice Premier of the State Council, proposed that colleges and universities should focus on improving the quality of postgraduate education, deepen reform and innovation, and promote connotative development. Taking research as the basic indicator to measure the quality of postgraduates, optimizing the layout of disciplines and majors, focusing on classified training, open cooperation, and cultivating high-level talents with research

and innovation capabilities. Strengthen the construction of the team of tutors, improve the education evaluation system for different degree types, strict quality management, school spirit and study style, and guide the high-quality development of postgraduate education. Through the research of the sample literature, although the relevant articles target the title of the article and the research object to the "postgraduate" group, the research content is not significantly different from that of undergraduates. Since some postgraduates have received information literacy education at the undergraduate level, more emphasis is placed on upgrading for such postgraduate groups; existing research has not paid attention to the "classified training" model of postgraduates, and there is no obvious distinction between the types of undergraduate degrees. However, postgraduates are divided into academic type and professional type. The former mainly cultivates teaching and scientific research talents, while the latter cultivates applied talents that are currently in short supply in the market. Therefore, the direction and positioning of their information literacy education are also different. Undergraduate students conduct research. Some studies deviate from "research", the basic indicator of postgraduate quality, so the suggestion to carry out information literacy education for postgraduates is not applicable. Some studies have not implemented the postgraduate training model of collaborative education, ignoring the primary responsibility of postgraduate tutors. Postgraduate tutors are also the key difference between postgraduate education and undergraduate education. The lack of linkage with tutors is also an unsatisfactory effect of postgraduate information literacy education. key reason.

The research dimension of information literacy education is relatively single, and systematic research is lacking

According to the analysis of sample literature, it is found that systematic research on information literacy education in colleges and universities is particularly lacking, and fragmented research is generally carried out only for a certain aspect. The author made a statistical summary of 100 sample documents. The research dimension is narrow and the focus is generally limited to needs analysis (n=13), information behavior (n=16), status investigation (n=19), education model (n=15),

curriculum Construction (n=13), teaching content (n=20) and other aspects, and the current postgraduate education has been transformed into connotative development, but the information literacy education layer remains in the process of quantitative change, and there is an urgent need to move from the testing area to the deep water area. It is necessary to provide guidance and guidance on advanced and systematic educational management theoretical research, but the contradiction lies in the fact that theoretical research is relatively single or fragmented, and systematic research is extremely scarce, which is difficult to guide and support practice development, and also restricts the information of postgraduates. Literacy education has achieved leapfrog development. At the same time, the existing research lacks the manager's perspective, and the modern education management science has not been effectively applied. At present, the planning and implementation of information literacy education for postgraduates relying solely on the library is obviously "impossible". It is necessary to improve the position, and it is urgent to strengthen the top-level design and incorporate it into the overall planning at the school level. The library, the Office of Academic Affairs and the various colleges and departments are coordinated to ensure the smooth implementation of information literacy education in an all-round way.

Research methods are limited to qualitative research, and decision-making lacks strong support

In terms of research methods, existing research is generally limited to qualitative research, few studies use quantitative research, and the relevant research conclusions lack support. How to measure the information literacy level of postgraduates scientifically and accurately is an important observation value for exploring education reform and system construction, but the measurement of information literacy level of postgraduates is too limited at this stage, expert interview methods, etc., are mainly qualitative research, and empirical research is rare. However, the sample size of the questionnaires is less than 100 (most of them are for graduate students of a certain level of their own universities, or a certain major), and the number of questions is small, so the results obtained are somewhat

biased. However, at the same time, statistical analysis found that 43.5% of the studies used two or more data collection methods, indicating that more and more studies have tried to eliminate the limitations of a single data source by integrating multiple data sources. , to ensure the reliability and accuracy of data analysis results.

5. Relate Researches

Batool S H, Atta-Ur-Rehman, Sulehri I (2022) highlighted the required main and subunits of IL course at the postgraduate level for library and information science or information management students through the Delphi process. The panelists were of the uniform view that computer, research; critical, copyright literacies are significant with a generic set of IL skills at this educational level. Moreover, the results demonstrate that IL course should be designed in a way that enables researchers to improve learning/collaborative learning and communication skills. Our study underlined the importance of IL at the postgraduate level while highlighting the important units of IL course components uniquely through the Delphi process. The results also suggest the unique literacy skill set for postgraduate students, including critical thinking, research literacy and analytical skills, etc. Our study results confirm that IL is situated within the context by indicating the need for copyright literacy and domain-specific literacy as a significant unit of IL instruction. Moreover, evidence from our study demonstrate that the IL domain is wider in scope with blurry boundaries. Additionally, it highlights the importance of IL as life-long learning to national and international readers. Moreover, this foundational work will allow the analysis of identified units and sub-units of IL courses at the postgraduate level in different contexts and also at other educational levels. Furthermore, our work provides insights into IL pedagogical and curriculum approaches in the domain of information management.

A Sorgo, Bartol T, D Dolnicar, et al. (2016) tested the predictive strength of some attributes of digital nativeness (ICT ownership, ICT experiences, internet confidence and number of ICT-rich university courses) on the information literacy (IL) of 299 Slovenian university students. Correlation and regression analysis based on

survey data revealed that the attributes of digital natives are poor predictors of IL. The principal findings are: ICT experiences expressed as the sum of the use of different applications do not necessarily contribute to IL; some applications have a positive and some a negative effect; personal ownership of smartphones, portable computers and desktop computers has no direct effect on IL, while ownership of a tablet computer is actually a negative predictor; personal ownership of ICT devices has an impact on ICT experiences and Internet confidence, and, therefore, an indirect impact on IL; and ICT-rich university courses (if not designed to cultivate IL) have only a marginal impact on IL, although they may have some impact on ICT experiences and Internet confidence. The overall conclusion is that digital natives are not necessarily information literate, and that IL should be promoted with hands-on and minds-on courses based on IL standards.

MarLia Pinto (2015) explained iInformation Literacy (IL) refers to a set of individual competencies which have an impact on education systems. In higher education (HE) IL has become a main issue of concern. Increasingly, universities are promoting a culture of IL education, mostly among their students. Universities are well aware of the need for promoting IL skills and fostering a larger autonomy for dealing with information-related problems. Thus, HE institutions ought to provide the appropriate assessment tools to reveal and analyze student achievements concerning IL skills and their level of acquisition of the related competencies. However, while there is a substantial bibliographic production about IL and HE, this is not the case for the more recent topic of “assessment” within the scope of IL and HE. On the other hand, its growth in recent years suggests that this is a subject with an immediate promising future. Hence, there is an increasing interest in addressing the issue of “Information Literacy Assessment in Higher Education” (ILAHE).

H Castanedapena, JW Barbosachacon, Marciales G, et al (2015) found in relation to the kind of academic tasks that could help students in order to develop information competencies, there are three special tasks recognized by students: research projects in class, information research tasks in disciplinary fields, and group work. Each one contributes to promote good practices related to information

performance in university academic contexts. The information literacy is realized via its application in the discipline when higher education curricula take in information literacy framed within an intra-curricular perspective. It is important to show the importance that teacher's expectations have over the students' information literacy development. According to the data, it seems that teachers' expectations about their students' written competences have incidence over the development of their information literacy profiles. This relationship between expectations, academic writing tasks, and information-literacy profiles is a research avenue that requires more.

Ellis C, Johnson F, Rowley J (2017) emphasized academic libraries have sought to become the leaders in the provision of information literacy (IL). This study seeks to identify to what extent IL is being promoted through institutional websites. Data was collected from all UK university websites (n=133) in early 2015 to identify the promotion of IL. Content analysis was used for the five categories: IL in the mission statement, visions or strategic plan; IL model or framework; IL policy; IL assessment; and, IL training. Data collection was limited to information in the public domain which could be accessed from individual websites, which were searched and browsed systematically. 85.7% of universities promote IL to some extent on their websites in at least one of the five categories, however the degree of the information provided varied extensively. Less than 6% of universities promote IL at institutional level. Only 17.3% refer to a model or framework, 15.8% show their IL policy and 9% provide information on their assessment of students' IL skills. Information on IL training is offered on 84.2% of websites, the most common method being online tutorials, although 52.6% only offer training for one or two aspects of IL, primarily information seeking and citing and referencing.

Baroutian S, Kensington-Miller B (2016) examined the usefulness of integrating information literacy as an auxiliary work shop into a postgraduate Food Processing course, with the focus on course and subject related information. Given the diverse background of the students enrolled in this programme (86% are international students) and the importance of the skills to be acquired, it is crucial that these students are supported to be successful. Food Processing is a complex

cross-disciplinary postgraduate program and supporting the international students who take up this course is challenging. The workshop introduced the students to the special nature of food science and food engineering information to make them familiar with key resources in the subject area. Quantitative and qualitative data on the usefulness of the workshop were collected in the form of pre- and post-workshop surveys and inter views, respectively, and a comparison was made between the two course assignments for further evidence. The results indicated the workshop improved the students' ability to identify discipline relevant databases, keywords and search terms, and their ability to evaluate information and cite the correct resources according to the standards and guidelines substantially improved. Another unexpected feature, but not necessarily surprising, was the students' level of coincidence significantly increased as a result of participating in the workshop.

Naveed. Asif M (2016) explored information seeking anxiety among 31 Pakistani university research students using the critical incident technique. Face to face interviews were conducted for data collection by visiting the participants in their departments. The results indicated that information seeking anxiety among Pakistani research students manifested in eight dimensions, namely: (a) procedural anxiety, (b) information overload, (c) resource anxiety, (d) library anxiety, (e) competence anxiety, (f) ICT anxiety, (g) language anxiety, and (h) thematic anxiety. These participants also exhibited certain avoidance behaviors, search avoidance, task avoidance, and even research avoidance, along with inferiority complex.

Godbey S (2018) explained with the Framework comes an expanded definition of information literacy as "the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning," a definition intended to "emphasize dynamism, flexibility, individual growth, and community learning."44 Identifying ways to assess these integrated abilities will challenge librarians and campus partners to take an integrated approach to information literacy and information literacy assessment. Librarians can and will find ways to assess aspects of

information literacy threshold concepts within one-shot instruction sessions, but engaging with students and student work beyond the scope of these sessions will be required to meaningfully approach the concepts included in the Framework. For example, an assessment aligned with the Framework is currently under development, the Threshold Achievement Test for Information Literacy (TATIL), which aims to provide “data-driven insights” into “the information literacy capabilities of their students” as defined by the Framework.45. This study was undertaken to explore the information literacy skills of future teachers. This sample suggests that students in these courses have a distinct need for improvement in information literacy skills in general, with particular skill areas in need of attention. Teachers must be adequately prepared to be effective educators. Perhaps an integrated approach using information literacy threshold concepts will enable us to effectively address both the affective and cognitive domains of learning. That said, our teachers also need to be competent in specific skills. These are the teachers who will be guiding our nation’s children until they reach us in our colleges and universities, working with these children to develop the skills they need to be successful in school and life. This study confirmed that, at least among this study population, work is still needed to improve the information literacy competency of our future educators.

Al-Qallaf CL (2020) explained while information literacy in undergraduate programs has received considerable attention, few studies have explored graduate programs, with even fewer focusing specifically on library and information studies (LIS) programs. Accordingly, this study aims to assess the information literacy skills and knowledge of incoming students in an information studies graduate program at Kuwait University. By assessing students before and after they receive information literacy instruction, the study also aims to map a plan for developing graduate-level information literacy education. The study’s rationale is to provide empirical evidence of graduate students’ information literacy and research capabilities on commencing their studies, which are expected to be low, thereby encouraging educators and policymakers to engage in meaningful, informed discourse on investing in information literacy education. To collect data, the author administered a pre-test at the

beginning of the semester, followed by a post-test at the end of the semester after students had attended a series of information literacy sessions. In addition, a faculty focus group was conducted to gain insight into their perceptions of students' skills and their views and beliefs on information literacy education. Students' overall mean score increased by almost 18% in the post-test. They performed better on questions related to knowledge of databases, search strategies, accessing sources, and some legal and ethical issues surrounding the information ecosystem. They also showed moderate improvement in critically evaluating information. However, they continued to perform poorly and understanding the nature and scope of the information paradigm. The endings informed the development of an information literacy education model. The study's research design provides a format for other institutions interested in identifying students' information and research needs with the aim of integrating information literacy instruction into graduate programs. The information literacy education model is dynamic and can be adapted to deferent learning environments.

Zinn S, Stilwell C, Hoskins R (2016) provided the context for South African education and a review of the information literacy literature with an emphasis on South Africa and teachers' information literacy. The results show that, despite many obstacles in these teachers' paths, they express a fairly sound understanding of information literacy education by the end of the journaling exercise. However, fewer teachers can competently mediate information literacy in the classroom.

Chapter 3
Research Methodology

This research uses a multivariate method to study: 1. To investigate the current situation of information literacy education for postgraduates in universities and colleges in Guizhou Province. 2. To analyze the main influencing factors of the quality of information literacy education for postgraduates in universities in Guizhou Province. 3. Use educational management science to formulate the development strategy of information literacy education for postgraduates in universities in Guizhou Province. the researchers have the following procedures;

The population / Sample Group

The Population

Managers of postgraduate education, information literacy teachers and postgraduate supervisors in universities in Guizhou province.

The Sample Group

Four different types of universities were selected as sample universities (Guizhou University, Guizhou Normal University, Guizhou University of Finance and Economics, Zunyi Medical University) among the postgraduate training universities in Guizhou Province, 10 postgraduate education managers and 10 information literacy teachers were selected from each university (divided into Stratified sampling method, randomly selected from leadership positions and non-leadership positions), 30 postgraduate supervisors from each university (simple random sampling method, selected from all postgraduate supervisors in the school), a total of 200 people.

Research Instruments

The tools used in this study include data analysis forms, questionnaires, observation forms, interview forms and adaptive assessment forms.

1. Data analysis table: The researcher develops according to the research idea, integrates the research data, and sets the research idea, which is the process of

classifying the analysis problems. When setting up the data analysis table, it mainly includes the current situation of postgraduate information literacy education development in Guizhou Province (mainly including postgraduate information literacy level and existing problems in information literacy education), and specific measures for postgraduate information literacy education management (mainly including education macro planning, education management model, resource investment guarantee, teacher team construction, teaching platform construction, quality supervision and evaluation, etc.), data sources include education-related research work, analysis and implementation-related literature, annual reports, meeting minutes and other materials, and propose the set data analysis table as a guideline for creating research tools.

2. Questionnaire: It can be divided into three parts, as follows:

Part 1: General information in the form of a checklist (Check List), including gender, age, position, and work experience (grade in attendance).

Part 2: Questionnaire for the current situation and existing problems of information literacy education for postgraduates in universities in Guizhou Province. The information literacy level of the interviewees will have corresponding scores, and the average score of all the interviewees is the information literacy education level of the postgraduates. A five-level evaluation scale was used, namely extra high, high, average, low and extra low, and respondents were asked to select only one level.

Part 3: According to development status of information literacy education for postgraduates in Guizhou Province, questionnaire on the main influencing factors of information literacy education quality for postgraduates in universities in Guizhou Province. The survey objects are postgraduate education administrators and supervisors. The contents and questions are arranged in the order of research elements as follows: macro-planning of education, education management model, resource input Security, teacher team construction, teaching platform construction, quality supervision and evaluation, etc. A five-level evaluation scale was used, namely extra high, high, average, low and extra low, and respondents were asked to select only one level.

3. Interview form: According to the current situation and existing problems of postgraduate information literacy education in colleges and universities in Guizhou Province, the researcher introduces relevant theories of education management, combined with the work experience and research foundation of information literacy education in universities in Guizhou Province. Conduct structured interviews.

4. Evaluation form for suitability of implementation: further study the development strategies of information literacy education for graduate students in Guizhou Province, covering the results of data analysis and comprehensive analysis of structured interviews with graduate education administrators and graduate students, and evaluated by experts.

Data Collection

1. Questionnaire:

The researcher explained the samples participating in the research project, and formulated the development strategy of information literacy education for graduate students in Guizhou Province according to the new situation and new requirements faced by postgraduate education management, so as to obtain permission to fill in the questionnaire. From April 2022 to May 2022, the researchers distributed questionnaires to universities in Guizhou Province and waited for the questionnaires to be returned in person. Check completed questionnaires and perform data analysis on valid questionnaires. For example:

Table 3.1 Investigate the development status, existing problems and development strategies of postgraduate information literacy education in sample universities in Guizhou Province

Index / University	Development planning	Form of Education	Resoutce investment guarantee	Teacher team construction	Teaching platform construction	Evaluation and optimization
Guizhou University						
Guizhou Normal University						
Guizhou University of Finance and Economics						
Zunyi Medical University						

2. Interview

(1) Analyze the development strategies for promoting the information literacy education of graduate students in Guizhou Province (the path to improve the quality of education);

(2) Set up the qualifications of participants in structured interviews, including administrators of graduate schools in Guizhou Province, supervisors and postgraduates;

(3) To select respondents who meet the qualifications of item (2) at the same time, the researcher invites respondents who volunteer to participate in the interview;

(4) Conduct interviews according to the steps.

Data Analysis

1. Questionnaire

Before analyzing the data, the researcher first checks the correctness and completeness of the questionnaire. If the data is found to be conflicting or incomplete, the researcher will directly ask the respondents for more information. Next, the researcher creates a data file to store the variables used in the study. When the data is prepared, the researcher will analyze the data in two steps, namely the preliminary analysis of the data and the in-depth analysis. as follows:

(1) Preliminary analysis of data, analysis of the characteristics of each research variable data, including preliminary data analysis and basic statistical analysis of variables using SPSS software data inspection tools. Preliminary data analysis is to analyze the background of the sample, including the gender, age, work experience (year of study) and professional background of the sample, and calculate the percentage and frequency; basic statistical analysis of variables is the basic statistical analysis of dependent variables, calculation mean and standard deviation.

(2) In-depth analysis, using the survey (assessment) questionnaire of information literacy level of postgraduates in Guizhou Province, to observe the quality of information literacy education of postgraduates in colleges and universities, and to analyze and determine the main influencing factors of the quality of postgraduate information literacy education in colleges and universities in Guizhou Province. According to the relevant theoretical methods of education management, study the development strategy of information literacy education for graduate students in Guizhou Province (the path to improve the quality of education), and further understand the mean and standard deviation.

2. Interview

Conduct interviews with graduate education management, supervisors and graduate students in Guizhou Province to understand the current situation and existing problems of graduate information literacy education in Guizhou Province, so

as to provide strong support for formulating the quality improvement strategy of graduate information literacy education in Guizhou Province.

3. Assess suitability of implementation

Basic statistical analysis of dependent variables, calculation of mean and standard deviation, further research on strategies to improve the quality of information literacy education for graduate students in Guizhou Province, covering data analysis and comprehensive trade-offs of structured interviews conducted by administrators of graduate schools and graduate students in relevant universities results and evaluated by experts.

Chapter 4
Results of Analysis

As the top of the national education sequence, postgraduate education shoulders the dual missions of the supply of high-end talents and the innovation of science and technology, which is of great significance to the realization of the national strategy and the support of the construction of a modern power. The Development Strategy of Information Literacy Education for Postgraduates in universities selected Guizhou Province, which is relatively backward in the development of higher education, as the research object, the problems are quite prominent and it has high research significance and reference value. The researchers systematically analyzed the current situation and existing problems of the development of information literacy education for postgraduates in Guizhou province, through investigation and analysis of factors affecting the development quality of information literacy education for postgraduates, finally formulated the development strategy of information literacy education for university postgraduates in the new era by applying modern higher education management science. In this chapter, researchers mainly present research results in the following four aspects.

Section I Personal information of graduate school administrators, information literacy teachers and graduate supervisors, divided into gender, work experience in graduate education, educational level and position

Section II Analysis of the current situation of information literacy education for postgraduates in universities in Guizhou Province

Section III Analysis results of the main influencing factors of information literacy education quality for postgraduates in universities in Guizhou Province

Section IV Analysis of development strategies of information literacy education for postgraduates in universities in Guizhou Province by using modern higher education management science

Section I Personal information of graduate school administrators, information literacy teachers and supervisors, divided into gender, work experience in graduate education, educational level and position

Table 4.1 General Information (n=200)

	Personal Information	Number of people	Percentage
Sex	male	109	54.5
	female	91	45.5
	total	**200**	**100**
Experience in postgraduate education	Not more than 5 years	14	7.0
	6 to 10 years	63	31.5
	11 to 15 years	55	27.5
	16 to 20 years	45	22.5
	Over 21 years	23	11.5
	total	**200**	**100**
Degree	Bachelor	3	1.5
	Master	49	24.5
	Doctor	148	74.0
	total	**200**	**100**
Position	Administrators	40	20.0
	Information teachers	40	20.0
	Supervisors	120	60.0
	total	**200**	**100**

According to Table 4.1, it can be found that most respondents are male (109, accounting for 54.5%) and female (91, accounting for 45.5%). Most of the respondents have been working in postgraduate education for 6-10 years, accounting for 31.5%, followed by 11-15 years, accounting for 27.5%, and the least is less than 5 years, accounting for 7.0%, with 14 people. The majority of respondents had a doctoral degree, with 148, accounting for 74 percent, followed by a master's degree, with 49, accounting for 24.5 percent. The majority of respondents were graduate supervisors (120, accounting for 60%), graduate school administrators and information literacy teachers (40, accounting for 20% each).

Section Ⅱ Analysis of the current situation and existing problems of information literacy education for postgraduates in colleges and universities in Guizhou Province

Ask the administrators of postgraduate education in universities in Guizhou Province about the current situation and ideal situation of postgraduate information literacy education, The difference between "Ideal situation" (5-point scale) and "Present situation" (5-point scale) was used to represent the severity of existing problems. Meanwhile, expert interviews were conducted to investigate the specific problems existing in the development of information literacy education for graduate students in colleges and universities in Guizhou Province. Typical problems exist as follows:

1. Development planning and administrative management: lack of overall planning and coordination between secondary departments

Through questionnaire survey and visits to relevant colleges and universities, it is found that none of the four colleges and universities has included postgraduate information literacy education into their educational development planning. Many staff members involved in postgraduate information literacy education say that due to many obstacles, postgraduate information literacy education cannot attract enough attention from the schools. It is customary for the university to assign graduate information literacy education to the "full-time work" within the library or the department, believing that graduate information literacy education should be decided by the library or the department independently. Due to the lack of overall planning and coordination at the school level and the lack of clear docking system between the library and the graduate education department, it is difficult to form a good situation that the library and the graduate education department jointly build the information literacy education. At present, only Guizhou University has set up an independent teaching and research office of library information literacy, which is responsible for the teaching of postgraduate information literacy in the whole university. Other universities have not set up a special teaching and research office for postgraduate information literacy. All universities are free to play their own roles

and gradually form two main teaching and management modes. One is the training mode of postgraduate information literacy represented by Guizhou University, which is "the library is the main part and the department is the auxiliary part". The main teaching task of postgraduate information literacy is undertaken by the library, and the other departments are assisted by the tutors. The other is represented by Guizhou Minzu University, where faculty members conduct information literacy education independently and library teachers provide subject service support. While achieving certain results, these two modes also reveal some problems, such as the fact that libraries and departments operate independently, lack overall institutional planning, and it is difficult to form joint forces for information literacy education. In the process of postgraduate information literacy education, contradictions between departments and other departments often appear, and there is a lack of school-level policy support and overall planning and control. It is difficult to mobilize professional talents to participate in the development of postgraduate information literacy education.

2. Guarantee level of resource investment: lack of fund guarantee and lack of sharing of educational resources

Resource investment is an important guarantee to realize information literacy education for postgraduates. Compared with universities in developed areas, there is still a gap in the resources invested in information literacy education for postgraduates in universities in Guizhou. First of all, the total investment of special funds for postgraduate information literacy education courses is limited, the funding cycle is insufficient, and the use efficiency is not high. According to the survey questionnaire and interviews with relevant universities, several professional information literacy teachers reported that the special funds for postgraduate information literacy education in their schools were extremely limited. Although some universities have carried out quality course construction projects for postgraduate information literacy, for example, Guizhou University of Chinese Medicine has a quality course construction project for postgraduate information literacy. However, the university has limited funding (the funding cycle is one year

and the funding is only 20,000 yuan), insufficient supporting measures and insufficient collaboration between departments, which makes it difficult to form a sustainable, replicable and extendable postgraduate information literacy course construction project. Secondly, the guarantee of research funds for postgraduate information literacy education is limited. During the interview, it is found that only Zunyi Medical University has been approved for postgraduate information literacy project, and the results output and promotion and application effects are not ideal. The lack of research funds for postgraduate information literacy education is not conducive to the scientific decision-making of improving the quality of information literacy education. As a result, the standard system of postgraduate information literacy education has not yet been formed for reference of universities in western China. Finally, the information literacy education resources of postgraduates have poor sharing, lack of willingness to share, and serious repeatability of educational resources. According to the survey, some universities have carried out the construction of information literacy education platforms. For example, Guizhou University has built a college information literacy education database, which contains resources such as micro-video teaching, live course teaching, case teaching and practical training platform. However, the sharing of information literacy education resources is poor, most resources are only used by teachers and students in the school, and the school has a poor willingness to share with the outside world, and it is difficult to form the cooperation and sharing of information literacy education resources between schools. At the same time, the survey found that the input of colleges and universities in information literacy education resources overlapped. For example, the online course resources offered by most colleges and universities were generally limited to the training of information retrieval skills, and lacked the cutting-edge, distinctive and targeted online education resources for postgraduate information literacy. This makes it difficult for the information literacy education resources among colleges and universities in Guizhou to form a development situation of complementary advantages, resource sharing and coordinated development.

3. The form of education development: the teaching form is single, and the teaching effect is difficult to guarantee

Information literacy education for postgraduates has both traditional offline teaching mode and online teaching mode enabled by information technology. Guizhou University, Guizhou Normal University, Guizhou Minzu University and other high schools have all carried out online and offline teaching models of information literacy. On the one hand, the traditional off-line teaching methods mainly include: course teaching, lecture training, postgraduate entrance training. Through questionnaire survey and visits to relevant colleges and universities, it is found that only 2 colleges and universities use rain class, micro class and other educational technologies to carry out face-to-face offline teaching in offline classroom teaching, while the other 7 colleges and universities all adopt the traditional teaching methods of ppt and blackboard writing. The boring and monotonous offline teaching mode can hardly stimulate students' intrinsic learning motivation and enthusiasm for after-class information retrieval practice. On the other hand, the online teaching methods of information literacy for postgraduates in Guizhou mainly include live teaching and recorded teaching. Guizhou Minzu University continuously enriches its online teaching resources by offering MOOCS for information literacy education. Through the construction of virtual library and the use of visualization technology, Guizhou University enables users to be physically present in the virtual scene, and further assists to improve the quality of information literacy teaching by increasing the sense of teaching atmosphere and immersion. Other universities set up online training lectures such as "freshman admission", "one-hour lecture" and "online game assessment" to enrich the online teaching forms of information literacy for postgraduates. However, through interviews with graduate students in colleges and universities in Guizhou, it is also found that there are common problems in online teaching, such as lack of teacher supervision, lack of interaction, poor real-time performance, poor sense of learning atmosphere, and difficulty in focusing attention. At present, the development form of information literacy education for postgraduates in Guizhou lacks the deep integration with educational technology,

and the innovative and unattractive teaching form is difficult to create a good atmosphere for information literacy education activities for postgraduates, and it is not attractive enough for postgraduates to participate in the learning and practice of information literacy.

4. Teacher team construction: lack of teaching backbone, lack of scientific and sustainable teacher training system

Teaching staff is an important basis to guarantee the quality of postgraduate information literacy education. The construction of teaching staff requires complete system guarantee, reasonable structure of teaching staff and clear division of responsibilities. Through questionnaire survey and visits to relevant colleges and universities, in order to promote the high-quality development of teachers, colleges and universities in Guizhou have adopted the system of talent introduction, independent training, continuing education, part-time teacher joining and so on. Among them, Guizhou University has launched a talent introduction and training project for information literacy education, matching the introduction methods and treatment of national-level leading talents, national-level young talents and talents with doctoral degrees according to different levels. But at the same time, there is also a prominent problem of weak information literacy teachers for postgraduates in colleges and universities in Guizhou Province. First of all, the lack of teaching backbone and academic leaders has become the bottleneck restricting the high-quality development of postgraduate information literacy education. The survey shows that there are generally less than two full-time graduate information literacy teachers in colleges and universities in Guizhou, and some colleges and universities even have no full-time graduate information literacy teachers. The education structure of full-time teachers in information literacy education is mainly master's or bachelor's degree, the professional title structure is mainly lecturer, and the age structure is mainly over 40 years old. The team of full-time teachers presents the problems of older age, lower educational background and lower professional title. The lack of teaching backbone and academic leaders makes it difficult to lead the continuous quality improvement of information literacy education for postgraduates.

Secondly, graduate information literacy education lacks a long-term teacher training plan, and it is difficult to form a sustainable teacher training system of information literacy education by hiring outside experts for lecture training, and it is even harder to adapt to the changing needs of graduate information literacy education. Finally, most universities do not have specialized postgraduate information literacy teaching and research departments, and only rely on part-time teachers from different departments with different professional backgrounds and lack of teaching experience to temporarily set up postgraduate information literacy teaching teams. It is difficult to form a working environment with good teaching environment, strong academic atmosphere and sufficient humanistic care, which also leads to difficulties in talent introduction. It is difficult to provide strong talent security and intellectual support for information literacy education of graduate students.

5. Level of educational content construction: educational concept is backward and curriculum content is monotonous

The content of information literacy education for graduate students refers to the knowledge, skills and values that are selected and incorporated into the process of educational activities in order to achieve educational goals. The common problems of information literacy education for postgraduates in Guizhou are: outdated educational concept, single course content and low practicability. First of all, the content of information literacy education courses for graduate students in colleges and universities in Guizhou is simple. Through questionnaire survey and visits to relevant colleges and universities, the courses of information literacy education for graduate students generally focus on information retrieval (literature retrieval) as the theme, and the content of information literacy education received by graduate students in different majors has little differentiation. Some teaching courseware is rough, the case selection is outdated, the theory explanation is stiff, the resource update is not timely, the integration of innovative ideas is insufficient, it is difficult to adapt to the demands of the academic situation of Chinese graduate students for information literacy knowledge. Secondly, the course content focuses on basic information retrieval skills. Most colleges and universities emphasize the retrieval and

utilization of library resources and databases, but are limited to resource orientation and skill orientation, and lack the cultivation of information ethics, information consciousness, information innovation and critical ability. At the same time, the content of the course is limited in the development of professional skills such as media literacy and data literacy, which are closely related to information literacy, and it is difficult to meet the objective needs of the cultivation of outstanding talents. In addition, some colleges and universities do not offer graduate information literacy education courses, but carry out graduate information literacy training through special lectures and freshmen entrance education, which obviously cannot meet the needs of graduate students for information literacy in scientific research activities.

6. Education quality assessment: the evaluation is not targeted, and the supervision mechanism is not perfect

The purpose of education quality assessment is to track the information literacy teaching dynamics of university graduate students, timely grasp the problems existing in education work, and provide decision-making basis for improving the quality of information literacy education of graduate students. Through questionnaire survey and visits to relevant universities, the information literacy education for graduate students is still limited to regular assessment of the teaching quality of postgraduate information literacy through collective lesson preparation, teaching seminars, teaching and learning meetings, teaching supervision, final examination and other methods. The evaluation system of the teaching quality of postgraduate information literacy is still in a state of urgent improvement, which leads to loopholes in education management. First of all, the targeted evaluation of graduate information literacy education evaluation standards does not accurately distinguish the evaluation standards of graduate education and undergraduate education. As a result, it is difficult for the performance appraisal based on evaluation standards to motivate teachers' enthusiasm for teaching, make teachers lack the motivation to compile textbooks, adjust teaching contents and innovate teaching forms, and stimulate the internal motivation to improve the quality of education. Secondly, the

monitoring and evaluation system of the quality of postgraduate information literacy education lacks the process and objective student evaluation mechanism. Most colleges and universities form a regular student evaluation mode through the mid-term teaching and learning meeting and the way of anonymous teaching evaluation in the teaching administration system. This kind of evaluation mode has the problems of strong subjectivity and insufficient authenticity, which is difficult to reflect the problems in the process of information literacy education of graduate students in a real and timely manner, and is difficult to provide accurate supervision of education quality. Finally, the course assessment mechanism of postgraduate information literacy is not perfect. As an important indicator to reflect the objective learning situation of students, some colleges and universities still only adopt the way of examination papers to assess the learning situation of students, which is difficult to reflect the actual effect of information literacy education in supporting scientific research and academic innovation methods, and cannot accurately evaluate the progress in the application and transformation of knowledge.

Section III Analysis results of the main influencing factors of information literacy education quality for postgraduates in colleges and universities in Guizhou Province

1. Define the operational definition of variables and the framework of variable measurement by referring to relevant literature, research reports and data related to variable measurement. Six first-level indicators and 30 second-level indicators are proposed. The six first-level indicators are: Development planning and education management, Form of Education, Resource input guarantee, Construction of teaching staff, Education content construction, Evaluation and optimization of educational.

2. The questionnaire was sent to three authoritative experts in the industry, and the IOC range was tested by experts. The Content analysis form and questionnaire were submitted to three authoritative experts in the industry to check the Content validity. The experts were asked to consider the consistency and suitability of each question according to appropriate and inappropriate operational

definitions, and suggestions on improving the questionnaire were solicited. Then calculate The corresponding Index (The Item Objective Congruence Index: IOC) of each problem and the operation definition. It is found that the index of each problem is 0.90-1.00, indicating that each problem is consistent with the operation definition. At the same time, Delphi technology was used to seek expert consensus, improve the questionnaire topic and expression, and finally determine the factor questionnaire.

3. Conduct investigation and reliability test

A Try-out was conducted on 30 non-sample managers and graduate supervisors of Zunyi Medical University with the questionnaire set, and then the collected data was used to check the quality of the tool. Cronbach's Alpha Coefficient was used to analyze the reliability of questionnaires, and it was found that the reliability of questionnaires was above 0.7, indicating high reliability and consistency.

The questionnaire has five dimensions, and the respondents give answers based on the actual situation. The researcher defines the standard of data interpretation, and carries out statistical analysis after collecting the questionnaire. According to the square variance and standard deviation of the factors affecting the development of information literacy education for graduate students in colleges and universities in Guizhou province, it can be included in six aspects.

Table 4.2 The main influencing factors of information literacy education quality for postgraduates in colleges and universities in Guizhou Province

(n=200)

Information literacy education quality for postgraduates in colleges and universities	$\overline{X}$	S.D.	Grade	Rank
Development planning and administrative management	4.77	.318	Very high	2
Form of Education	4.75	.345	Very high	4
Resource input guarantee	4.73	.417	Very high	6
Construction of teaching staff	4.75	.329	Very high	4
Education content construction	4.79	.301	Very high	1
Evaluation and optimization of educational quality	4.76	.319	Very high	3
total	**4.76**	**.340**	**Very high**	

According to Table 4.2, it can be found that there are six factors influencing the development of information literacy education for graduate students in colleges and universities in Guizhou Province, and the average level is extremely high ($\overline{X}$=4.76),Specifically, it can be found that the average level of education content construction is the highest ($\overline{X}$=4.79), followed by development planning and education management ($\overline{X}$=4.77), and the average level of resource investment guarantee is the lowest ($\overline{X}$=4.73).

Table 4.3 The main influencing factors of Development planning and administrative management

(n=200)

	Development planning and administrative management	$\bar{X}$	S.D.	Grade	Rank
1	Information Literacy Education for Postgraduates is included in the overall development plan of the school	4.97	.157	Very high	1
2	Have a special management department or management team	4.95	.229	Very high	2
3	The development objectives and management system have been scientifically formulated	4.75	.446	Very high	3
4	Educational development programs emphasize the distinction between postgraduates and undergraduate students	4.72	.495	Very high	4
5	The education development plan defines long-term and short-term goals	4.49	.750	high	5
	total	**4.77**	**.318**	**Very high**	

According to Table 4.3, the dimension of "development planning and administrative management" includes five main aspects, it can be found that the average level of Information Literacy Education for Postgraduates is included in the overall development plan of the school is the highest ($\bar{X}$=4.97), followed by a special management department or management team ($\bar{X}$=4.95), and the average level of the education development plan defines long-term and short-term goals is the lowest ($\bar{X}$=4.49).

Table 4.4 The main influencing factors of form of Education

(n=200)

	Form of Education	$\overline{X}$	S.D.	Grade	Rank
1	Build a perfect "Online + offline" mixed teaching mode	4.98	.140	Very high	1
2	In addition to classroom teaching, expand and open forums, salons, lectures and other forms	4.84	.368	Very high	2
3	Constantly innovate and reform new teaching paradigm	4.72	.448	Very high	4
4	Pay attention to the combination of theoretical teaching and practical exercise	4.75	.470	Very high	3
5	Combine the new situation to innovate the teaching paradigm constantly	4.47	.736	high	5
	total	**4.75**	**.345**	**Very high**	

According to Table 4.4, the dimension of "Form of Education" includes five main aspects, it can be found that the average level of Information Literacy Education for Postgraduates is “Build a perfect "Online + offline" mixed teaching mode” is the highest ($\overline{X}$=4.98), followed by “In addition to classroom teaching, expand and open forums, salons, lectures and other forms” ($\overline{X}$=4.84), and the average level of “Combine the new situation to innovate the teaching paradigm constantly” is the lowest ($\overline{X}$=4.47).

Table 4.5 The main influencing factors of form of Resource input guarantee

(n=200)

Resource input guarantee		$\overline{X}$	S.D.	Grade	Rank
1	With special construction funds	4.96	.231	Very high	1
2	A complete teaching platform or practice base has been established	4.83	.381	Very high	2
3	A perfect practice base has been created	4.68	.678	Very high	4
4	Approved curriculum construction project or teaching reform project	4.74	.496	Very high	3
5	To construct a perfect information literacy education curriculum system for postgraduates	4.46	.762	high	5
	total	**4.73**	**.417**	**Very high**	

According to Table 4.5, the dimension of "Resource input guarantee" includes five main aspects, it can be found that the average level of Information Literacy Education for Postgraduates is “With special construction funds” is the highest ($\overline{X}$=4.96), followed by “A complete teaching platform or practice base has been established” ($\overline{X}$=4.83), and the average level of “To construct a perfect information literacy education curriculum system for postgraduates” is the lowest ($\overline{X}$=4.46).

Table 4.6 The main influencing factors of construction of teaching staff

(n=200)

	Construction of teaching staff	$\overline{X}$	S.D.	Grade	Rank
1	The professional structure of teachers is reasonable	4.96	.208	Very high	2
2	The professional title structure of teachers is reasonable	4.97	.171	Very high	1
3	The educational structure of teachers is reasonable	4.49	.868	high	5
4	Arrange teachers to receive professional training and continuing education	4.76	.437	Very high	3
5	The proportion of full-time and part-time teachers is reasonable	4.57	.615	Very high	4
	total	**4.75**	**.329**	**Very high**	

According to Table 4.6, the dimension of "Construction of teaching staff" includes five main aspects, it can be found that the average level of Information Literacy Education for Postgraduates is “The professional title structure of teachers is reasonable” is the highest ($\overline{X}$=4.97), followed by “The professional structure of teachers is reasonable” ($\overline{X}$=4.96), and the average level of “The proportion of full-time and part-time teachers is reasonable” is the lowest ($\overline{X}$=4.57).

Table 4.7 The main influencing factors of education content construction

(n=200)

Education content construction		$\bar{X}$	S.D.	Grade	Rank
1	The education content fully covers the macro requirements of information literacy education, including information ethics, information ethics, information ability, information awareness, etc	4.96	.196	Very high	1
2	The education content fully covers the specific requirements of scientific research practice activities, including literature retrieval, postgraduate research methods, intellectual property protection, paper writing and journal submission, etc	4.94	.258	Very high	2
3	The education content fully covers the core literacy requirements, including scientific research literacy, data literacy media literacy, etc	4.93	.275	Very high	3
4	The teaching content is specially designed for postgraduates of different majors	4.46	.950	high	5
5	The teaching content meets the requirements of the new situation for postgraduates	4.68	.558	Very high	4
	total	**4.79**	**.301**	**Very high**	

According to Table 4.7, the dimension of “Education content construction" includes five main aspects, it can be found that the average level of Information Literacy Education for Postgraduates is “The education content fully covers the macro requirements of information literacy education, including information ethics, information

ethics, information ability, information awareness, etc" ($\overline{X}$=4.96), followed by "The education content fully covers the specific requirements of scientific research practice activities, including literature retrieval, postgraduate research methods, intellectual property protection and utilization, paper writing and journal submission, etc" ($\overline{X}$=4.96), and the average level of "The teaching content is specially designed for postgraduates of different majors" ($\overline{X}$=4.57).

Table 4.8 The main influencing factors of evaluation and optimization of educational quality

(n=200)

	Evaluation and optimization of educational quality	$\overline{X}$	S.D.	Grade	Rank
1	The school regularly organizes special inspections on Information Literacy Education of postgraduates	4.95	.229	Very high	1
2	Regularly hold meetings or teaching seminars for mutual benefit of teaching and learning	4.84	.372	Very high	3
3	Regularly measure the effect of information literacy education for postgraduates	4.87	.384	Very high	2
4	Organize teaching supervision experts to carry out teaching evaluation and guidance in class regularly	4.66	.527	Very high	4
5	Organize postgraduates to evaluate and feedback information literacy education regularly	4.48	.680	high	5
	total	**4.76**	**.319**	**Very high**	

According to Table 4.8, the dimension of "Evaluation and optimization of educational quality" includes five main aspects, it can be found that the average level of Information Literacy Education for Postgraduates is "The school regularly organizes

special inspections on Information Literacy Education of postgraduates ($\overline{X}$=4.95), followed by “Regularly measure the effect of information literacy education for postgraduates” ($\overline{X}$=4.87), and the average level of “Organize postgraduates to evaluate and feedback information literacy education regularly” ($\overline{X}$=4.48).

Then the researcher calculated the KMO value. It can be seen from the chart that the KMO value is 0.888 (Appendix D), close to 1.00. It can be clearly seen that the survey information has been fully supported and consistent with the analysis of the paper. At the same time, Chi-Square values from Bartlett's Test of Sphericity can be verified in terms of data, and the correlation matrix of variables is correlated, so data can be further analyzed.

As shown in the table, the overall reliability of the questionnaire is 0.929, including Development planning and education management, Form of Education, Resource input guarantee, Construction of teaching staff, Education content construction, Evaluation and optimization of educational, the reliability was 0.895, 0.892, 0.893, 0.893, 0.937 and 0.898, which fully indicate that the six factors have significant influence on the development of information literacy of graduate students in universities.

In summary, this paper summarizes the analysis results of the development factors of information literacy in colleges and universities in Guizhou Province, and also answers the first objective of this study, "Influencing factors of the development of information literacy education for graduate students in colleges and universities in Guizhou Province", which consists of six factors, namely: Development planning and education management, Form of Education, Resource input guarantee, Construction of teaching staff, Education content construction, Evaluation and optimization of educational.

Section IV Analysis of development strategies of information literacy education for postgraduates in colleges and universities in Guizhou Province by using modern higher education management science

The analysis results in this part are based on the information provided by the interviewees. The researchers specially invited authoritative experts to evaluate and interview the development strategies of information literacy education in colleges and universities in Guizhou Province. The panel includes 20 university leaders in charge of graduate education, leaders of graduate schools and leading experts in the fields of higher education and information literacy education. The content of assessment and interview is mainly divided into six aspects, and the evaluation level is divided into five levels. Questions 1-5 are about development planning and administrative management, questions 6-10 are about the form of education development, and questions 11-15 are about Resource input guarantee. Questions 16-20 are about the Construction of teaching staff, questions 21-25 are about Education content construction, Questions 26-30 are about Evaluation and optimization of educational quality. The evaluation results are as follows:

Table 4.9 Experts evaluated the mean and standard deviation deviation of information literacy education development strategies in universities in Guizhou Province

(n=20)

Development strategies of information literacy education for postgraduates in colleges and universities in Guizhou Province by using modern higher education management science	$\bar{X}$	S.D.	Grade	Rank
Integrate postgraduate information literacy education into the overall development plan of the university	4.80	.410	Very high	8
Establish a professional management department or management team (emphasizing clear division of labor and cooperation)	4.85	.366	Very high	4
Develop a scientific management system for postgraduate information literacy education	4.85	.489	Very high	5
Development plan should clearly distinguish between graduate students and undergraduates	4.65	.489	Very high	17
Educational development planning should clearly distinguish between long-term goals and short-term goals	4.35	.745	High	26
Build an integrated online and offline information literacy education mode for postgraduates	4.95	.224	Very high	1
Teaching methods are tailored to postgraduates	4.70	.470	Very high	13
Pay more attention to the reform and innovation of teaching paradigm	4.85	.366	Very high	6

Table 4.9 (continued)

Development strategies of information literacy education for postgraduates in colleges and universities in Guizhou Province by using modern higher education management science	$\bar{X}$	S.D.	Grade	Rank
Pay more attention to combining theory with practice	4.40	.754	High	25
Make full use of multimedia to carry out teaching	4.65	.671	Very high	18
Special construction funds should be allocated	4.75	.444	Very high	12
Build an information literacy education platform for postgraduates	4.70	.571	Very high	14
Build the practice base of information literacy education for postgraduates	4.80	.410	Very high	9
Construct and perfect the curriculum system of postgraduate information literacy education	4.30	.801	High	30
Approve the relevant curriculum construction projects	4.65	.745	Very high	19
Optimize the professional background of teachers (vigorously introduce teachers with professional background of higher education and library information science)	4.90	.308	Very high	2
Optimize the rank structure of information literacy teachers	4.35	.813	High	27
Optimize the age echelon of information literacy teachers (mainly refers to the working years)	4.65	.671	Very high	20
Optimize the proportion of full-time and part-time teachers	4.60	.598	Very high	23

Table 4.9 (continued)

Development strategies of information literacy education for postgraduates in colleges and universities in Guizhou Province by using modern higher education management science	$\bar{X}$	S.D.	Grade	Rank
Improve the continuing education system for teachers	4.65	.671	Very high	21
Improve the pertinence of teaching content for postgraduates	4.55	.686	Very high	24
Improve the differentiation of teaching content of different majors	4.85	.489	Very high	7
Meet the needs of postgraduate research activities	4.65	.587	Very high	22
Meet the requirements of postgraduate core literacy	4.80	.523	Very high	10
Adapt to the requirements of training graduate students in the new media era	4.35	.875	High	28
Schools should carry out regular inspection of information literacy education for postgraduates	4.80	.410	Very high	11
Collect graduate students' satisfaction with information literacy education regularly(including opinions and suggestions).	4.90	.308	Very high	3
Improve the supervision mechanism integrating evaluation, examination and incentive	4.70	.571	Very high	15

Table 4.9 (continued)

Development strategies of information literacy education for postgraduates in colleges and universities in Guizhou Province by using modern higher education management science	$\bar{X}$	S.D.	Grade	Rank
Experts should be organized to evaluate and guide teaching in the classroom	4.70	.571	Very high	16
Teaching seminars should be held regularly (attended by administrators, teachers and graduate students at the same time)	4.35	.813	High	29
Total	**4.67**	**.602**	**Very high**	

On the basis of determining the influencing factors of the development of information literacy education for graduate students in Guizhou Province, after understanding the current situation, existing problems and expected goals, the development strategy of information literacy education for graduate students in colleges and universities in Guizhou Province is formulated according to modern higher education management science, and the evaluation table of the suitability of implementation is set up (5-level rating scale, Are very high, high, average, low and very low). A specific sample group (objective sampling) with 20 people, including school leaders, graduate school leaders and senior experts in information literacy education, is selected from authoritative experts in the industry. The specific characteristics are as follows.

There are 20 experts in this survey: in terms of gender distribution, most of them are male (12, accounting for 60%) and female (8, accounting for 40%). In terms of age distribution, most people are between 51 and 60 years old, with a total of 9 people, accounting for 45%. In terms of job distribution, most of them are senior experts in information literacy education, 8 in total, accounting for 40%; In addition, 7

graduate school leaders, accounting for 35%; 5 university leaders, accounting for 25%.

After the experts completed the evaluation of adaptability (appropriateness criteria), feasibility criteria, practicability criteria and accuracy, the experts were scored statistically. The mean value was 4.670 and the variance was 0.602. Meanwhile, data analysis was conducted on the specific scores of experts, and the calculated reliability was 0.850, indicating that these six strategies are scientific and feasible.

To sum up, the combination of expert interviews and field visits can help develop planning and education management, Form of Education, Resource input guarantee, Construction of teaching staff, Education content construction, Evaluation and optimization of educational measures in six aspects of the elaboration, form the following scientific and detailed implementation strategy.

1. Development planning and administrative management

Information literacy has become the core quality of postgraduates in the new era, which is of great significance to the improvement and all-round development of postgraduates' innovation ability. In recent years, the universities of our country have been gradually exploring and conducting a series of information literacy education activities in various forms at the graduate stage, which has obtained some practical results. However, some problems have also been exposed in this process. For example, a standard system has not been formed to be referenced yet. Therefore, it is necessary for us to draw lessons from the experience of ACRL's "standard first", study the core idea of "New Framework" seriously, give full play to the guiding role of Information literacy Education Working Group of Library and Information Work Steering Committee of Higher Education Ministry of Education, and deeply investigate the current situation of information literacy education for Chinese graduate students. The expert group was organized to compile and improve the standard system and top-level design scheme of information literacy education, and pay attention to stratified guidance and regional guidance, so as to promote the coordinated development of information literacy education for postgraduates across China.

2. Form of Education

Curriculum is the foundation of teaching construction in colleges and universities, and curriculum construction is one of the important contents of the basic construction of school teaching. Therefore, under the new wave of "Internet +" and "mass entrepreneurship and innovation", strengthening the construction and management of information literacy courses is an important guarantee to effectively improve the teaching level and training quality of postgraduate information literacy. At present, the common problems of information literacy education of our graduate students are: low degree of attention, old idea, single course content, and low practicality. Based on this, our country needs to integrate the latest ideas of "New Framework" issued by ACRL with the reference of the "Information Literacy Ability Standard for Higher Education", integrate the ideas of outstanding talent training and information science theory, based on the academic situation of graduate students in our country and their demands for information literacy knowledge, and draw reference from the information literacy education curriculum systems of America and Europe and other developed countries. To reconstruct the curriculum content of our graduate information education, it aims to integrate the content of information literacy education into the courses of our different stages, step by step, promote the considerable development of the information literacy education of our graduate students, and realize the high position, strong thinking, strategic layout and construction planning of information literacy education from multiple perspectives.

3. Resource input guarantee

The results of information literacy education have a close relationship with the investment of resources. At present, the information literacy education of our graduate students is still in a developing stage, so we should make more efforts to ensure the investment of educational resources. The input and guarantee of resources can be carried out from the following aspects: (1) Introducing experts in the field of information literacy education in a flexible way, strengthening the strength of Chinese information literacy education teachers, regularly inviting overseas experts to carry out short-term training courses or training classes on information literacy, expanding the international

perspective of teachers and students, promoting the level of Chinese information literacy between teachers and students and international standards. (2) Strengthen the development of online platforms and high-quality online courses, integrate outstanding online course resources at home and abroad, ensure that there are enough course resources to meet the practical needs of the information literacy education for graduate students in our country, and create the "golden course" for graduate information literacy. (3) Strengthen the evaluation and improvement of teaching, take the industry standard as the guidance, take the improvement of postgraduate scientific research quality as the opportunity, pay attention to the satisfaction of postgraduate audience and the solution of information needs, carry out teaching and learning meetings among the teaching teachers based on the teaching situation, and promote the information literacy and professional quality of information science teachers to improve significantly. Provide resources guarantee and intellectual support for the intension development of Chinese information literacy education.

4. Construction of teaching staff

At present, according to the present situation of information literacy education for graduate students in Chinese universities, information literacy teachers have exposed some common problems: The aging of the teaching team is obvious, the knowledge system is outdated, the discipline structure is missing, the teaching concept is outdated, the teaching supply capacity and the demand is seriously unbalanced, and so on. It is necessary to strengthen the team structure, improve the team efficiency and strengthen the team education ability by injecting new forces, introducing international standards and concepts, training excellent teachers and other measures. (1) In terms of the professional ability of teachers, it is necessary to strengthen international and inter-school exchanges between information literacy teachers, build a long-term mechanism of collaborative interaction, timely grasp the characteristics of information behavior of postgraduates in the era of big data, accurately study and judge the needs of information literacy education, pay close attention to hot issues in relevant fields of society and academia, and enrich the teaching content according to the situation. Constantly improve their library and information professional quality and information

literacy education ability. (2) In the aspect of team building, professional teachers and teaching and research department of information literacy education for graduate students can be set up based on post competency, which is specially responsible for the orientation development of courses, teaching reform, quality control and other work, so as to provide strong talent guarantee and intellectual support for the concurred development of information literacy education for graduate students.

5. Education content construction

Nowadays, although some graduate students' information literacy education in Chinese universities has been catching up with and catching up with, the whole is still lagging behind in teaching mode and teaching methods. Teachers are still the main part of the single teaching activity, and students' participation is low, which restricts the innovative development of information literacy education in our country to a certain extent. Under the background of big data and the "Internet +" era, the information literacy education of graduate students in colleges and universities should be guided by the development needs of professional talents, combined with the convenience of new media and advanced computer technology, to build a new paradigm of teaching reform of information literacy education for graduate students. (1) Expand teaching methods, make full use of the excellent learning resources of the existing MOOC platform, build a new teaching mode combining online and offline, and realize the optimization and integration of digital construction, network technology and traditional face-to-face teaching mode. (2) Integrate gamification elements and use virtual reality technology to build virtual scenes, so as to meet students' demands for learning and training environment, enhance graduate students' learning enthusiasm and practical interest in information literacy courses, and guide graduate students to practice information literacy education in interactive and simulation games according to game rules. (3) Create an environment for information literacy education, carry out embedded situational teaching, and improve the information literacy of graduate students in scientific research and systematic practice. At the same time, a virtual information literacy community is built, in which students can leave messages, ask questions and discuss. Through the communication and interaction between teachers and students, the efficiency of

information interaction and the level of conversational teaching are effectively improved, which provides decision-making reference for the deepening reform of information literacy education for graduate students and promotes the comprehensive improvement of information quality and innovation ability of graduate students.

6. Evaluation and optimization of educational

Monitoring and evaluation of teaching quality aims to track and understand the teaching dynamics of information literacy education for graduate students in colleges and universities, timely solve the problems existing in teaching work, and comprehensively improve the quality of education. At present, the quality monitoring mechanism, evaluation basis and assessment standard of information literacy courses urgently need to issue clear standards or regulations. Relevant universities should improve the teaching reform management mode and quality monitoring and evaluation system according to the graduate training plan and practical needs. (1) Establish a student evaluation mechanism, and track student evaluation is a method used to judge learning effectiveness. Using big data analysis technology, this paper accurately captures the information behavior characteristics of postgraduate information literacy courses in teaching, scientific research, work and study, and makes a comprehensive comparative analysis, so as to find problems in time and provide information feedback and decision-making reference for course construction, optimization and adjustment and teaching reform. (2) Improve the monitoring and evaluation system of teaching effect, expand the evaluation subjects and methods, give full play to the supervision role of course teaching quality, guide teachers to improve teaching methods, and enhance the teaching level of information literacy education for postgraduates. (3) Develop course assessment mechanism, innovate information literacy assessment methods, make use of new media and information technology platform, make students attach great importance to information literacy courses, fully mobilize students' subjective initiative, and promote the sustainable development of postgraduate information literacy education.

Chapter 5
Discussion Conclusion and Recommendations

Research Objectives

The aims of the present study include:

1. To investigate the current situation of information literacy education for postgraduates in Guizhou Province.

2. To analyze the main influencing factors of information literacy education quality of postgraduates in universities in Guizhou province.

3. According to the main factors determined by statistics and combined with the current situation and problems, the development strategy of information literacy education for postgraduates in Guizhou province will be formulated by using educational management science.

Research Methodology

The theme of this study is the Development strategy of information literacy education for postgraduates. The research system involves a wide range of contents, including Development planning and education management, Form of Education, Resource input guarantee, Construction of teaching staff, Education content construction, Resource input guarantee, construction of teaching staff, education content construction, Evaluation and optimization of educational research, which requires the comprehensive use of theoretical analysis, literature research, investigation, typical cases, comparative research and other research methods, pay attention to the combination of theoretical analysis and empirical research.

1. Literature research method: It mainly refers to the method of collecting, identifying and sorting out literature, and forming a scientific understanding of facts through literature research. In this study, it mainly refers to mastering the connotation evolution of information literacy education for graduate students and the requirements of The Times of higher education management, and combing the

research history of related topics through reading literature.

2. Theoretical analysis: based on certain theoretical principles and analysis of the research process, so as to form the judgment and action plan method. Applying theoretical analysis method to solve practical problems requires managers to have profound theoretical accomplishment. Various theories reflect the nature and laws of the objective world from different levels, sides and angles. For a manager, it is necessary to be familiar with and master philosophical theories, management theories and professional theories.

3. Survey research method: It is a method to collect materials and make educational prediction through questionnaires, interviews and discussion. This is one of the most familiar, commonly used and effective methods used by domestic education forecasters. This method can take the following forms: (1) questionnaire. Send questionnaires to relevant personnel, ask them to fill in the answers, and then collect, analyze and study; (2) Visit. In order to understand the situation and collect the required information, the investigator goes deep into the reality and directly talks with the person under investigation face to face. (3) Discussion. Prepare a survey outline for the question. Ask questions to the people at the meeting, make speeches and discuss, and then analyze different opinions to get the right one. It is effective to predict the future of distance education by means of investigation and research. In order to improve the reliability and accuracy of the investigation, the three forms of the investigation method can be used individually or comprehensively.

4. Case analysis: a social science research method that studies and analyzes typical events in social life or typical examples of social practice according to some general principles, in order to seek ideas, methods and models to solve similar problems in related fields, put forward new problems, explore general rules and test certain conclusions.

5. Interdisciplinary research method: It is also known as “cross-research method”, which uses multidisciplinary theories, methods and achievements to conduct comprehensive research on a subject as a whole. The purpose of

interdisciplinary is to realize the integrated research of problems by going beyond the previous research methods of categorization. This study makes extensive use of interdisciplinary research to comprehensively promote scientific and efficient organization and implementation of research, covering higher education, education management, library and information science, administrative management, organizational behavior and human resource management and other disciplines.

Conclusion

1. What is the current status of information literacy education for postgraduates in universities in Guizhou Province?

Development planning and education management: lack of overall planning and coordination between secondary departments

Guarantee level of resource investment: lack of fund guarantee and lack of sharing of educational resources

The form of education development: the teaching form is single, and the teaching effect is difficult to guarantee

Teacher team construction: lack of teaching backbone, lack of scientific and sustainable teacher training system

Level of educational content construction: educational concept is backward and curriculum content is monotonous

Education quality assessment: the evaluation is not targeted, and the supervision mechanism is not perfect

2. What factors affect the quality of information literacy education for postgraduates in universities in Guizhou Province?

Development planning and administrative management

Information Literacy Education for Postgraduates is included in the overall development plan of the school

Have a special management department or management team

The development objectives and management system have been scientifically formulated

Educational development programs emphasize the distinction between postgraduates and undergraduate students

The education development plan defines long-term and short-term goals

Mode of educational practice

Diversified information literacy education model for graduate students

Information literacy teaching methods for postgraduates

Reform and innovation of teaching paradigm

Connect theory with practice

Make full use of multimedia for teaching

Resource input guarantee

Special construction funds are allocated

Information literacy education and teaching platform for graduate students

Information Literacy Education Practice Base for graduate students

Perfect curriculum system of information literacy education for graduate students

Approved relevant curriculum construction projects

Construction of teaching staff

Composition of teachers' professional background (mainly based on the background of higher education and library information science)

Grade structure of information literacy teachers

Age echelon of information literacy teachers (mainly refers to years of service)

Proportion of full-time and part-time teachers

Professional training and continuing education systems for teachers

Education content construction

The teaching content is targeted to graduate students

The teaching content is distinguishable for different majors

Covering the specific requirements of scientific research practice

Meet the requirements of graduate core literacy

Adapt to the requirements of training postgraduates in the new media era

Evaluation and optimization of educational quality

Information literacy education inspection system for postgraduates

Attach importance to teaching satisfaction with information literacy teachers

Supervision mechanism integrating evaluation, examination and incentive

Teaching supervision experts enter the classroom to carry out teaching evaluation and guidance

Regular teaching seminars (between teachers and students)

3. According to the main factors determined by statistics and combined with the current situation and problems, how to use educational management science to formulate the development strategy of information literacy education for postgraduates in Guizhou Province?

Improve the development plan of information literacy education for postgraduates by applying modern higher education management science

Information literacy has become the core literacy of postgraduates in the new era, which is of great significance to the improvement of postgraduates' innovation ability and all-round development. Traditional information literacy education is mainly carried out independently by the library, but the new wave of "mass entrepreneurship and innovation" and the new concept of scientific research and education have put forward higher requirements for postgraduate information literacy. The traditional information literacy education model and mechanism can no longer meet the core requirements Literacy cultivation requires that information literacy education should be listed as a systematic project, which involves many aspects such as teachers, courses, resources, teaching methods, and practice platforms. In recent years, colleges and universities in our country have also gradually explored and carried out a series of information literacy education activities in various forms at the postgraduate stage, and achieved certain practical results. However, some problems have also been exposed in this process. According to the reference standard system, all colleges and universities are free to play and do their own thing, which leads to the unbalanced development of postgraduate information literacy education in the country. Therefore, it is necessary for us to

learn from ACRL's experience of "Standards First", carefully study the core ideas of the "New Framework", give full play to the guiding role of the Information Literacy Education Working Group of the Ministry of Education's Higher Education Library and Information Work Steering Committee, and conduct in-depth research on the information literacy of graduate students in my country. Education status, organizing expert groups to compile and improve the information literacy education standard system, top-level design schemes, etc., focusing on layered guidance and sub-regional guidance, and promoting the coordinated development of postgraduate information literacy education in various parts of my country. Specific implementation strategies include Integrate postgraduate information literacy education into the overall development plan of the university, Establish a professional management department or management team (emphasizing clear division of labor and cooperation), Develop a scientific management system for postgraduate information literacy education, Development plan should clearly distinguish between graduate students and undergraduates, Educational development planning should clearly distinguish between long-term goals and short-term goals.

Innovative the mode of information literacy education for postgraduates

At present, although some postgraduate information literacy education in colleges and universities has achieved latecomer and overtake, the overall teaching model and teaching method are still lagging behind, and teachers are still the main body to complete a single teaching activity, and students' participation is low, which restricts my country's education to a certain extent. Innovation and development of information literacy education. Under the background of big data and "Internet +" era, postgraduate information literacy education in colleges and universities should be oriented to the development needs of professional talents, combined with the convenience of new media, and integrated with advanced computer technology, to build a new paradigm for postgraduate information literacy education and teaching reform. (1) Expand teaching methods, make full use of the excellent learning resources of the existing MOOC platform, build a new online and offline teaching

mode, and realize the optimization and integration of digital construction, network technology and traditional face-to-face teaching mode. (2) Create an environment for information literacy education, and carry out embedded situational teaching, so that postgraduate information literacy can be improved in scientific research and systematic practice. At the same time, build a virtual information literacy community, where students can leave messages, ask questions and discuss. Through the interaction between teachers and students, the efficiency of information interaction and the level of conversational teaching can be effectively improved, providing decision-making reference for the deepening reform of postgraduate information literacy education, and promoting the information quality and innovation ability of graduate students are comprehensively improved. (3) Incorporate gamification elements and use virtual reality technology to build virtual scenes to meet students' needs for learning and training environments, enhance the learning enthusiasm and practical interest of graduate students in information literacy courses, and guide graduate students to follow the rules of the game in interactive and simulation games Practice information literacy education. Specific implementation strategies include Build an integrated online and offline information literacy education mode for postgraduates, Teaching methods are tailored to postgraduates, Pay more attention to the reform and innovation of teaching paradigm, Pay more attention to combining theory with practice, Make full use of multimedia to carry out teaching.

Strengthen resource input guarantee in multiple aspects

Under the new situation, the discipline evaluation and development evaluation of colleges and universities pay more attention to the quality of the student training process, and pay more attention to the improvement of students' core literacy and comprehensive ability. Information literacy has gradually become a key indicator for evaluating the quality of education. Compared with universities in developed countries, there is still a gap in the development of information literacy education in domestic universities, and it is difficult to innovate or achieve connotative development. In some universities, it is even limited to simple freshmen

training. The key reason is the lack of resource investment and strong intellectual support. At present, China's postgraduate information literacy education is still in the early stages of development, and it is necessary to increase investment in educational resources as a guarantee for sustainable development. The input and guarantee of resources can be carried out in the following aspects: (1) Introduce experts in the field of information literacy education in a flexible manner, enrich the strength of my country's information literacy education teaching staff, regularly invite overseas experts to conduct short-term information literacy training courses or intensive training courses, and broaden the scope of information literacy education. The international vision of teachers and students will promote the level of information literacy of teachers and students in my country to be in line with international standards. (2) Increase the development of online platforms and high-quality online courses, integrate excellent online course resources at home and abroad, ensure that there are enough course resources to meet the actual needs of postgraduate information literacy education in my country, and create a "golden course" for postgraduate information literacy. (3) Strengthen teaching evaluation and improvement, be guided by industry standards, take the opportunity of improving the quality of postgraduate scientific research, pay attention to the satisfaction of postgraduate audiences and the resolution of information needs, and carry out teaching and learning meetings among teaching teachers around the teaching situation to boost teaching Teachers' information literacy and information science professional quality have been significantly improved, providing resource guarantee and intellectual support for the connotative development of information literacy education in my country. Specific implementation strategies include Special construction funds should be allocated, Build an information literacy education platform for postgraduates, Build the practice base of information literacy education for postgraduates, Construct and perfect the curriculum system of postgraduate information literacy education, Approve the relevant curriculum construction projects.

Strengthen the construction of teachers for information literacy education

In order to promote information literacy education in colleges and universities to adapt to the new situation and solve new problems faced by the development of information literacy education as soon as possible, the Department of Higher Education of the Ministry of Education issued the “Guiding Opinions on Further Strengthening Information Literacy Education in Colleges and Universities”. According to the previous discussion draft, the guiding opinions “teaching staff” will be clearly listed as one of the two major conditions for information literacy education. At present, according to the current situation of information literacy education for postgraduates in colleges and universities in my country, various common problems have been exposed in the teaching staff of information literacy: obvious aging of the teaching staff, outdated knowledge system, lack of discipline structure, outdated teaching concepts, serious teaching supply capacity and demand Imbalance etc. Universities should grasp the opportunities and challenges faced by information literacy education in the new situation, and make a good combination of postgraduate information literacy education teachers’ team creation: (1) In terms of teachers’ professional ability, strengthen the international and inter-university exchanges of information literacy teachers, Build a collaborative and interactive long-term mechanism, timely grasp the information behavior characteristics of graduate students in the era of big data, accurately study and judge the needs of information literacy education, pay close attention to hot issues in related fields in society and academia, enrich teaching content according to the situation, and continuously improve the professional quality of library information and information literacy education ability. (2) Colleges and universities should incorporate the training of information literacy education teachers into the school’s talent training plan, pay attention to the training of high-level teaching backbones and academic leaders, and lead the continuous improvement of teaching quality and reform and innovation. (3) In terms of team building, with post competency as the guide, a professional postgraduate information literacy education teaching staff and teaching and research section can be established to be responsible for the directional

development of courses, teaching reform, quality monitoring, etc. Provide strong talent guarantee and intellectual support for the development of the industry. Specific implementation strategies include Optimize the professional background of teachers (vigorously introduce teachers with professional background of higher education and library information science), Optimize the rank structure of information literacy teachers, Optimize the age echelon of information literacy teachers (mainly refers to the working years), Optimize the proportion of full-time and part-time teachers, Improve the continuing education system for teachers.

Enrich the content construction of information literacy education for postgraduates

Under the situation of "Internet +" new format and the wide application of MOOC platform, strengthening the construction and management of information literacy courses is an important guarantee to effectively improve the teaching level and training quality of graduate information literacy. At present, the common problems of information literacy education for graduate students in colleges and universities in my country are: low attention, outdated concepts, single course content, and low practicability. Based on this, it is urgent to release the latest concept of the "New Framework" in conjunction with ACRL, refer to the "Information Literacy Competency Standards for Higher Education", integrate the concept of excellent talent training and information science theory, base on the academic situation of graduate students in my country and the demands for information literacy knowledge, and learn from the United States And the information literacy education curriculum system of developed countries such as Europe, scientifically formulate curriculum standards, and provide scientific basis for teaching material compilation, teaching, evaluation and examination proposition; reconstruct the content of information literacy education courses for postgraduates in my country, and target the content of information literacy education according to the plan, Step by step, organically integrate into courses at different stages, promote the rapid development of postgraduate information literacy education in my country, and realize the strategic layout and construction planning of information

literacy education with a high position, strong thinking, and multiple perspectives. At the same time, we are in an information society with a ubiquitous environment, and the development of libraries is also moving towards ubiquitous development. The ubiquitous library 4A environment (Anyone, Anytime, Anywhere, Anything) is gradually becoming a reality. How to effectively guide graduate students to make full use of the library and the ubiquitous information environment should be included in the important units of information literacy education courses for graduate students in colleges and universities to effectively ensure the authority, feasibility, flexibility, and reliability of information literacy education curriculum construction. Specific implementation strategies include Improve the pertinence of teaching content for postgraduates, Improve the differentiation of teaching content of different majors, Meet the needs of postgraduate research activities, Meet the requirements of postgraduate core literacy, Adapt to the requirements of training graduate students in the new media era.

Strengthen quality supervision and rectification of information literacy education for postgraduates

Teaching quality monitoring and evaluation aims to track and understand the teaching dynamics of postgraduate information literacy education in colleges and universities, solve problems in teaching work in a timely manner, and comprehensively improve the quality of education. At present, the quality monitoring mechanism, evaluation basis, and assessment standards of information literacy courses in my country urgently need to issue clear standards or regulations. Relevant colleges and universities should combine the graduate training plan and actual needs to improve the teaching reform management model and quality monitoring and evaluation system. (1) Establish a student evaluation mechanism, tracking student evaluation is a method for judging learning effectiveness. Use big data analysis technology to accurately capture the characteristics of information behavior in the development of postgraduate information literacy courses and in teaching, scientific research, work, study, etc., and conduct comprehensive comparative analysis to find problems in time. At the same time, the ubiquitous

information environment brings the embarrassment of information flood and information shortage, which puts forward higher requirements for the recall rate and precision rate of document retrieval, which has also become an important indicator for testing the learning effect and practical level of postgraduate information literacy courses. (2) Improve the teaching effect monitoring and evaluation system, expand the evaluation subjects and methods, give full play to the role of course teaching quality supervision, guide teachers to improve teaching methods, improve the teaching level of postgraduate information literacy education, and provide information for course construction, optimization adjustment and teaching reform Feedback and decision reference. (3) Develop a course assessment mechanism, innovate information literacy assessment methods, and use new media and information technology platforms to make students attach great importance to information literacy courses, fully mobilize students' subjective initiative, and promote the sustainable development of postgraduate information literacy education. Specific implementation strategies include Schools should carry out regular inspection of information literacy education for postgraduates, Collect graduate students' satisfaction with information literacy education regularly (including opinions and suggestions), Improve the supervision mechanism integrating evaluation, examination and incentive, Experts should be organized to evaluate and guide teaching in the classroom, Teaching seminars should be held regularly (attended by administrators, teachers and graduate students at the same time).

Discussion

Experiences in the development

According to the current problems in the development of information literacy education for postgraduates in universities in Guizhou Province, the researchers compare and analyze the advantages and experiences in the development of information literacy education for postgraduates at home and abroad, which lays a strong foundation for the formulation of development strategies.

1. Cambridge University: Top-level design advantages of information literacy education management for postgraduates

In recent years, universities in Europe and the United States have taken the institutional, hierarchical and systematic Information Literacy Education Plan as the top-level design of graduate information literacy education. Cambridge University, as the representative of research-oriented public universities in Europe and America, closely follows the key words of "discovery, reflection, understanding and creation" to reform the information literacy education framework of graduate students, among which "critical spirit" and "lifelong learning" are two core strategic concepts in the Information Literacy Education Plan of Cambridge University (CILN):

Cultivating critical spirit plays an important role in the information literacy education planning of Cambridge University. "Information Literacy Education Framework of Cambridge University" (CILN) points out: "The credibility and quality of information sources are influenced by authority and information planners. However, learners often believe in authority, neglect to examine the process of information creation, and lack critical thinking. Therefore, it is very urgent to cultivate critical reflection on information. "Cambridge University integrates critical spirit into the whole process of postgraduate information literacy education. When searching, using and evaluating information, graduate students should know the process of information creation and dissemination and how the creators and communicators of information influence the authority of information. Cambridge University encourages graduate students to think, identify and analyze information from different angles, and urges graduate students to maintain a continuous critical spirit for the information they receive.

The concept of lifelong learning is embodied in the whole stage of information literacy education planning of Cambridge University. The concept of lifelong learning in the Information Literacy Education Framework of Cambridge University (CILN) is mainly embodied in the following two aspects: First, the information literacy education plan of Cambridge University integrates information literacy education with the educational objectives of other disciplines. The teaching

mode of information literacy for graduate students is not linear and single, but closely combines information literacy education with graduate students' personal academic development, forming a multi-dimensional, cross-disciplinary and organic integration of other disciplines. Secondly, the information literacy education under the concept of lifelong learning can bring continuous help to graduate students, so that graduate students can quickly adapt to the requirements of society and market for their information literacy after graduation, and provide guidance for graduate students' continuous learning of information literacy in the future. Critical spirit and lifelong learning constitute the two pillars of the top-level design of information literacy education in Cambridge University, and on this basis, a complete information literacy education planning system has been developed.

2. Peking University: three-dimensional innovative development path of education reform

Peking University has launched a number of innovative measures in postgraduate information literacy education, and achieved outstanding results. It has always been at the forefront of postgraduate information literacy education in China. It mainly promotes the paradigm development of postgraduate information literacy education reform around three dimensions: "innovation of gamification teaching activities, development of blended education curriculum, and embedded and integrated lecture reform".

Innovation of gamification information literacy teaching activities.

With the rise of the idea of gamification of information literacy education in China, Peking University actively explores the gamification mode of information literacy education, and successively publishes two mobile games about information literacy education on the network platform of Peking University Library-"Madman's Plan" and "The First Meeting of the Library". On the one hand, gamification is an innovation of information literacy education, which can effectively enhance graduate students' participation and immersion, stimulate their subjective initiative in information literacy teaching activities, and arouse their learning enthusiasm. On the other hand, the gamification of information literacy education activities has a

positive impact on graduate students' emotional cognition by repeatedly emphasizing the core knowledge points of information literacy education in games. It allows graduate students to map the originally boring theoretical concepts and practical skills of information literacy into interesting game projects in an interactive and collaborative virtual teaching scene, and subtly integrate information processing skills and ideas into information acquisition behavior. Solve the problems of students' poor initiative and low participation in traditional information literacy education, and promote the sustainable and innovative development of information literacy education.

Hybrid information literacy curriculum development.

In recent years, with the rise of MOOC, micro-course and flip-classroom curriculum mode in China, Peking University actively explores the multi-dimensional and hybrid information literacy education curriculum construction, which is mainly reflected in the following three innovations. First, the online development of information literacy courses under the "Internet+Education" dimension. Peking University has successively published a number of online open courses of information literacy education on the platforms of "MOOC of China University", "Love Courses" and "Netease Open Courses", which enriched the resources of online information literacy education courses for postgraduates in China, broke through the limitations of traditional information literacy education in time and space, and helped students to study information literacy courses anytime and anywhere. Second, multi-disciplinary collaborative innovation of information literacy education under the integration dimension. As an important position of information literacy education for postgraduates, the library, by cooperating with other colleges and combining the characteristics of different disciplines, embeds the information literacy education content into the courses of different professional entities, breaking through the boundaries between disciplines and forming a cross-border integration and development trend of information literacy education and other disciplines. Third, the information literacy curriculum construction under the dimension of individual needs. The evaluation function module or external evaluation system is

embedded in the online teaching platform of Peking University. Through the evaluation of students' information literacy level, we can accurately grasp each student's information literacy level, so that teachers can formulate personalized teaching content according to individual differences of students, and form a complete teaching construction, evaluation and feedback system, which is helpful to solve the problem of individual differences of students in information literacy education.

Embedded integrated information literacy lecture reform.

The lecture system of information literacy education in Peking University Library consists of two modules, namely, general lectures on information literacy education and special embedded integrated lectures. Compared with the traditional general lectures on information literacy, embedded integrated lectures for different majors are more popular among graduate students. The integration mode can be roughly divided into: one-time embedding, phased embedding (including extensible embedding and layered embedding), and whole-process embedding. According to the teaching requirements of graduate students' information literacy in different majors in Peking University, different levels of embedded and integrated lecture modes are carried out. For example, in the "customized lecture" project hosted by Peking University Library, one or two class hours are set in a professional course offered by teachers. Library researchers introduce the electronic resource retrieval skills related to the course in the professional course, and organically combine information literacy education with professional course education in a partially embedded way. In addition, some professional graduate tutors will invite library researchers to serve as second tutors for graduate students. According to the different stages of graduate academic research, the second tutors will give targeted lectures on information literacy from different angles, or directly give "one-on-one" guidance, and guide graduate students' thesis writing through the internet, mail, telephone, etc., so as to help graduate students obtain continuous information literacy guidance through the whole embedded mode.

3.Wuhan University: four-in-one collaborative linkage system

Wuhan University, as the leading demonstration representative of postgraduate information literacy education, has been committed to the frontier research of information literacy education. In recent years, Wuhan University has applied the research results of postgraduate information literacy education in teaching practice, gradually forming a trend of integration. Based on the four-in-one integration of "multi-subject integration, multi-literacy integration, multi-teaching mode integration, and introduction of academic ethics", a collaborative linkage system has been formed, which provides continuous assistance for the healthy development of information literacy education in Wuhan University.

Multi-subject integration, breaking through barriers between schools and departments.

First, Wuhan University Library cooperated with more than 30 university libraries, such as Peking University Library and Renmin University Library of China, to set up library (learning) online course alliance. The cooperation mode of multi-agent information literacy education platform breaks the traditional barriers between schools and promotes the coordinated development of information literacy education in the whole country. Second, Wuhan University encourages libraries to cooperate with other departments, break down barriers between departments, and move information literacy education activities from libraries to departments, for example, let professional teachers of departments participate in the construction of library information literacy education platform, participate in the planning of information literacy curriculum objectives of library teaching and research sections, promote cross-border cooperation between library researchers and teachers of other departments, increase the positive impact of information literacy education activities on teachers' teaching ideas of other departments, help information literacy education content gradually integrate into other professional curriculum platforms, and realize multi-level, multi-disciplinary and multi-field cooperative innovation.

Multi-literacy integration, expanding the content of information literacy education.

In the teaching practice of Wuhan University, the subject boundary of traditional information literacy teaching content is constantly expanded, and multi-literacy is integrated, mainly by adding two types of data literacy education and media literacy education to the information literacy education content, forming a comprehensive information literacy education content, helping students to establish a complete understanding of the complex and ever-changing information world. In the era of big data, data literacy is an expansion of information literacy. In recent years, governments at home and abroad have paid increasing attention to data literacy education. Wuhan University has carried out teaching practices related to data literacy, such as the general course “Data Literacy and Data Utilization”, which helps students form a complete awareness of data value from data discovery, data skills, data ethics and data innovation. At the same time, expand lectures related to data literacy education such as Digital China and Cultural Computing, Digital Humanities and Interdisciplinary Research, and combine digital technology with new cultural computing. In addition, Wuhan University has expanded another dimension of information literacy education-media literacy. Wuhan University not only has specialized courses in media literacy for graduate students majoring in media, but also has excellent general courses in media literacy training for graduate students. Wuhan University has continuously enriched the traditional information literacy teaching content from two aspects: data literacy and media literacy, forming a diversified and compound information literacy teaching content system.

Multi-teaching mode integration to stimulate the subjective initiative of the educated.

First, on the basis of diversified and mixed teaching modes such as MOOC, micro-classroom, and flip-classroom, a large number of videos, audios, and pictures are introduced into classroom teaching with the help of multimedia technology, so as to enhance the attraction of teaching. By using intelligent teaching software such as “Rain Classroom”, ppt taught by teachers is synchronized with students’ mobile

phones, and students can directly ask real-name or anonymous questions on ppt, thus enhancing the interaction between students and teachers and promoting the interactive development of teaching activities. Second, Wuhan University has created a visual teaching activity model. Wuhan University Library has set up a multimedia reading area, in which virtual reality device (VR) experience uses virtual reality technology and visual simulation technology to integrate abstract information literacy teaching content. Third, Wuhan University has explored the game-based development mode of information literacy teaching. It has released the "Save Bun" teaching game for newly enrolled undergraduates and graduate students, helping students to get familiar with the library as soon as possible and arousing students' strong interest in information literacy learning.

Introduce academic ethics to promote the healthy development of information literacy education.

Under the new information environment, people are actively creating, sharing and spreading information while accepting, consuming and absorbing information. In the academic field, graduate students output information by publishing papers and abide by academic ethics and academic norms, which are the moral standards and behavioral norms that graduate students need to adhere to when entering the academic hall. On the one hand, Wuhan University has formulated the Detailed Rules for the Implementation of Wuhan University's Academic Ethics, which requires all teachers and students to jointly safeguard academic ethics and standardize academic behavior, which provides macro-level policy guidance for the development of information ethics education. On the other hand, the library of Wuhan University has carried out various forms of information moral education activities for doctoral and doctoral students based on the course of Academic Ethics and Academic Norms, embedding information moral teaching contents into various interesting teaching activities, and mastering the basic knowledge and laws and policies of academic ethics imperceptibly in the experience of interesting teaching activities to help graduate students establish correct information awareness, information ethics and information ethics.

4. University of Oslo, Norway: Experience of innovation advantage in information literacy education for postgraduates

In the early 1970s, with the emergence of information technology, the concept of “information literacy” (IL) was gradually formed and developed, and it was recognized as the “important literacy” in the 21st century. Northern Europe has developed higher education and rich experience in information literacy education. For example, Helsinki University of Science and Technology offered information science courses for students in 1970s. In recent years, the information literacy education of graduate students in Nordic universities has always maintained the momentum of forge ahead, reform and innovation. As one of the Nordic member countries, Norway’s information-related policies and education cover the main content of “information literacy”. The country’s higher education institutions and libraries have been at the forefront of the development of information literacy education in Norway, while the higher education institutions, as the benchmark of information literacy education in the country, are the largest in Northern Europe and have the highest international reputation. Oslo University, the oldest university, has formed its unique advantages and distinctive features in information literacy education for graduate students.

A strong top-level design

Oslo University has a strong top-level design for postgraduate information literacy education, adopting the broad connotation of “information literacy”. When making curriculum plans, in order to meet the habit of contemporary postgraduate students hunting for knowledge in digitalization, diversification, fragmentation, personalization and experience, the traditional information literacy general knowledge and digital education knowledge are integrated through relevant system platforms, so as to enhance the effectiveness of postgraduate information literacy education, such as information retrieval skills, academic ethics, digital resource retrieval and utilization, teaching of academic software application, etc.

Course construction and management

The information literacy education of university graduates in Oslo mainly includes two parts: library information retrieval education and library academic publishing literacy education, which are rich in content and basically cover the knowledge, common sense and skills needed in the academic field. The courses are mainly face-to-face and supplemented by self-study, including offline courses, online courses and resource guides. Among them, the course "Professional Database Retrieval and Utilization Skills" focuses on the study and guidance for literature and medicine, while the course "Literature Retrieval and Utilization Skills" mainly introduces and guides the mainstream library collections, patent applications, manuscript resources and other types.

Academic publishing literacy education

Postgraduates' academic publishing literacy education in Oslo mainly covers common reference standards APA, dissertation counseling, academic journal evaluation, academic integrity education, OA policy education, ORCID, information management technology management, intellectual property education, etc., covering the knowledge, common sense and skills needed in academic fields, and attaches great importance to academic integrity education; In Oslo University, the thesis counseling is mainly for master's thesis and doctoral thesis writing. There is an online guide for academic evaluation, among which Research Impact: Journal Metrics is the most detailed. Intellectual property education mainly covers copyright laws in related fields, concepts and restrictions of knowledge sharing, how to protect personal research data and copyright of digital works, etc.

The choice concept of development strategies of information literacy education for postgraduates in universities in the New Era

1. Strengthen top-level design and clarify the concept of innovative development of information literacy education

At present, domestic colleges and universities lack scientific development plans for postgraduate information literacy education, especially the top-level design, ultimately leading to the lack of a unified standard for reference in our country.

However, the information literacy education plans within European and American colleges and universities have basically reached an agreement on cultivating students' abilities to judge and reflect on information. According to the top-level design of postgraduate information literacy education in our country, the critical spirit actually has two main meanings. On the one hand, top-level designers can constantly reflect on the nature of information literacy education in a critical spirit, actively analyze the profound problems in the current literacy education system, and even orderly improve the deficiencies in the education planning to promote the healthy development of information literacy education. On the other hand, through timely clarifying the strategic position of the critical spirit in the top-level design, it can improve the postgraduates' critical reflection competence on information. Along with the continuous development of information technology, information service providers can push information according to users' individual preferences. In gradual, people are surrounded by disguised authoritative information, and lose the abilities to criticize, reflect, analyze, and question information. As the top of the national education sequence, our postgraduates should establish an independent critical spirit, timely question the sources of authoritative information, reflect on the effect of information creation and communication, and ultimately form a complete information world view. This is consistent with the results of Ellis C's research (2017) that "For IL to be successful it requires integration at all levels of an institution particularly support from top management, therefore meaning that even if the IL training does not appear on the website because of it being a sales tool, IL would still be included within the mission statement, visions or strategic plans as these are available on every university website". This is also consistent with the results of Li Jun (2022, P.89) proposed that the development strategy of information literacy education could be incorporated into the short, mediumand long-term development plans of universities by learning from the practice of British universities, so that information literacy education could be fully integrated into the training programs of all majors of the university and run through students' entire university career. At the same time, schools should adopt relevant documents, policies and measures in

accordance with changes in environment and conditions to ensure that the development strategy of information literacy education can be implemented to ensure that all students have the opportunity to acquire these important lifelong independent learning skills.

2. Using the advantages of digital technology to create a paradigm for education and teaching reform

Along with the development of new intelligent technologies represented by big data, artificial intelligence and block-chain, the surrounding information environment is constantly updating and upgrading. In the new environment, the construction of technology-driven teaching platform must continuously innovate according to the development of new technologies. The information literacy education platform for postgraduates should actively absorb various technological advantages, adopt the organic combination of various technologies to improve the literacy education platform efficiency, and gradually form a multi-technology platform, such as introducing micro-video information literacy education model through the organic combination of Internet technology and micro-video technology. In addition to the cross-border technology integration, the development of information literacy teaching platform also must timely break down the barriers between schools and departments and even the thinking boundaries among traditional disciplines, so as to achieve a cross-field, cross-disciplinary and cross-industry development model. As we all know, the traditional information literacy teaching platform was constructed independently by the library, making it difficult to meet the information literacy education demands of postgraduates in different majors and disciplines. It should be realized that, postgraduates in the new information environment are not only consumers, but creators, sharers and co-builders of information. In this aspect, the construction of the information literacy education platform for postgraduates must timely listen to their opinions to build an interactive, open and democratic information literacy model. At the same time, this platform also should cooperate with various departments, teachers and students to form an excellent information literacy education system. This is consistent with the

hypothesis that A Sorgo (2016) test passed that ”The impact of various ICT applications on information literacy ranges from negative to positive; Personal ownership of ICT devices has an impact on ICT experiences, web confidence and information literacy; ICT-rich university courses have an impact on ICT experiences and student confidence”. It’s also consistent with their conclusion that digital natives are not necessarily information literate, as university educators, must prepare and introduce study courses with hands-on and minds-on activities, in which all aspects of IL, as described in the standards and summarized above, are included in the curriculum and thoroughly evaluated. This is also consistent with the results of Huang Lixia (2021, P85) proposed that most postgraduate information literacy teaching models tend to ignore the confusion of students in learning, and more emphasis should be placed on their mastery of the characteristics and rules of their own learning. The dominant flipped classroom and MOOC expand students’ “learning” space and reduce teachers’ “teaching” time, which can promote students’ learning enthusiasm. However, these two teaching modes do not pay attention to the process of students’ thinking and judgment, such as the technology and rules that students need to master in information ethics.

3. Give full play to the synergy of multiple subjects and build a three-level linkage education system

Judging from the actual development of postgraduate information literacy in our country, a postgraduate information literacy education system jointly constructed by the country, the market, and universities must be the future trend. Firstly, our country is the designer of the postgraduate information literacy education strategy. Through continuously improving the top-level design of information literacy education, our country has formed a complete set of incentive system to reformed the national fiscal and taxation system. Thus, the corresponding tax deduction and fiscal subsidies can help alleviate the funding pressure for constructing the postgraduate information literacy education courses, thus better releasing market vitality and actively guiding the market, colleges and universities to jointly participate in the education curriculum construction. Secondly, colleges and universities

undertake the task of postgraduate information literacy education. Colleges and universities play an irreplaceable role in the construction of the information literacy education system. They undertake the task of postgraduate information literacy education and also responsible for the design of various curriculum systems. In addition, some colleges and universities also divide the information literacy curriculum system into the professional compulsory and elective courses. In recent years, however, a few colleges and universities have tended to reduce the credits of postgraduate information literacy education courses and realize its transformation from the compulsory into elective nature. This would have a great impact on the stability of the information literacy education curriculum system in colleges and universities, and further weaken students' learning interest, gradually leading to the weakened dominant position of information literacy education. To improve the postgraduate information literacy education system, it is very necessary to accurately grasp the balance between the compulsory literacy courses and elective courses, and fully ensure the sustainable development of the information literacy education curriculum system. Thirdly, the market and society are the promoters of constructing the information literacy education system. Based on following the laws of education, the development of postgraduate information literacy education within colleges and universities should appropriately introduce market mechanisms to give full play to its positive guidance and incentive function, actively mobilize various social resources to encourage the integration of market funds into the postgraduate information literacy education, so as to constantly adapt to the market demands and new requirements. In addition, it can also better serve the healthy economic and society development in our country through combining with the high-level talent training requirements. This is consistent with the results of Pinto M's research (2020) that "The thematic evolution of research on Mobile Information Literacy between 2006 and 2019 in the field of Information Literacy, learning and mobile technologies is analyzed in an international context. For this purpose, the relevant bibliographic references from five databases (ERIC, LISA, LISTA, Scopus and WOS) were retrieved. To systematize the keywords, high dimensionality is reduced by means of a term-based process. Fields,

topics, sub-topics and top terms are defined. The main top-terms and their relationships are analyzed applying the fractional counting methodology using VOSViewer software. Fifteen major themes were set, which were grouped into six clusters to identify the main thematic trends during the period under review: IL and e-learning, Mobile devices and competencies, Ethics, Library and e-resources, Educational technology and Technological environment. The convergence of IL and e-learning, the growth of e-literacy, the increasing relationship between mobile devices and information competencies, as well as that of libraries and e-resources, are thus detected. In conclusion, there is evidence of a growing interdisciplinary in the scientific publications on Mobile Information Literacy, which interrelates the studies of information and digital literacy with e-learning and mobile technologies". This is also consistent with the results of Xiao Xinxiang (2021, P.121) proposed to create a good environment for information literacy education, create a suitable software and hardware environment for information literacy education, fully integrate the resources of library, network center and modern education technology center, build an information support service center, and provide teachers with new teaching technology skills training, curriculum construction support services, and wisdom research support services.

4. Focus on the standard of postgraduate education and promote the cultivation of outstanding talents from a higher starting point

Postgraduate information literacy education is of great significance to promoting the construction of high-level talents in China. In detail, postgraduate information literacy education means to meet higher requirements, and focuses more on the research needs of postgraduates. In this regard, adhering to the "postgraduate-oriented" approach to promote the cultivation of outstanding talents has the following significance. The first is to "adhere to the postgraduate-oriented approach", which means to put forward higher requirements for postgraduates information literacy education than undergraduates literacy education. Undergraduate information literacy education focuses on cultivating their basic skills of discovering and retrieving information, while postgraduate information literacy

education focuses more on expanding their abilities to evaluate, analyze and innovate information literacy. What's more, information literacy education for postgraduates pays more attention to cultivating their information awareness, information ethics, information norms and other abilities, which aims to help form a higher, more complete and richer information worldview of information reflection, information questioning and information innovation. The second is to "adhere to the postgraduate-oriented approach", which requires to focus on helping postgraduates improve their scientific research abilities. Information literacy education for postgraduates should run through the whole cultivation phrases of scientific researches, especially being reflected in the thesis selection, literature review, literature citation, research methodology, thesis reflection, publishing and other processes. The main purpose of information literacy education for postgraduates is to help them master advanced research information retrieval and utilization skills, standardize their academic standards and formats, and ultimately form a set of targeted postgraduate research information literacy education system. The third is to "adhere to the postgraduate-oriented approach", which requires to meet the individualized information literacy education needs of postgraduates. Postgraduate information literacy education requires making full use of various information literacy assessment technologies to solve the current trust crisis in the literacy assessment mechanism, so as to help educators better grasp the actual information literacy demands. What's more, it is also essential to timely formulate targeted educational plans to promote the mutual integration between postgraduate information literacy education and scientific researches. This is consistent With the results of Al-Qallaf CL's (2020) research that "To maximize the benefits of information literacy education, it is imperative to advocate the mission of information literacy within the context of the institution and its stakeholders by: identifying methods of instruction; creating content in accordance with information literacy constructs; assessing students' achievement and systematically evaluating the program; sharing pre- and post-tests results with students; adopting collaboration among educators to create a community of instructors; ensuring program transparency". This is also consistent

with the results of Zhang Hong (2019, P.90-91) proposed that the industry is the direct employer and has the best understanding of the talent situation. The industry has the most important say whether the professional degree is suitable for the social and economic development. Whether the information knowledge and ability of engineering masters can adapt to the development of the industry completely depends on whether they can solve the problems encountered in the construction of production facilities, product design and development, operation and sales, and enterprise management.

Recommendations

Implication

1. To improve the top-level design as a guide, overall coordination of information literacy education.

The high-quality development of graduate students' information literacy can't be separated from the information literacy education plan with high standing, strong thinking and multi-perspectives, and the school needs to fully coordinate various departments to form a joint force of information literacy education. (1) Strengthen the top-level design. Incorporate the graduate information literacy education development plan into the overall education development plan of the school. Combining with the present situation of school development and the unique academic situation of graduate students, we should construct the information literacy education plan for graduate students which is suitable for school education development plan, scientific research needs of graduate students and short-term, medium-and long-term goals. Promote the deep coupling mechanism between the development of postgraduate information literacy education and the development of school education quality, and form a virtuous circle of mutual promotion between the quality of postgraduate information literacy education and the quality of higher education. (2) Establish an inter-departmental coordination system. Set up a special management department for postgraduate information literacy education to coordinate the postgraduate information literacy education in the whole school.

At present, the library is still the main force to carry out information literacy education for postgraduates, but in fact, many other subjects in colleges and universities are also responsible for information literacy education for postgraduates, and the guarantee of departments, educational administration departments and relevant administrative departments is also essential. For all kinds of problems, contradictions among departments and obstacles in the development of postgraduate information literacy education in schools, it is necessary to set up a special working committee for postgraduate information literacy education to coordinate and deal with related problems, and constantly promote the cooperative relationship between libraries and departments in postgraduate information literacy education, so as to contribute to the high-quality development of postgraduate information literacy education. (3) Promote the integration and coordination of information literacy education resources. Due to the limited information literacy education resources in western colleges and universities, it is necessary to fully integrate and coordinate educational resources. Schools should strengthen the sharing and utilization of educational resources, make overall plans for information literacy education resources in schools, and ensure the high-quality development of postgraduate information literacy education, which is strongly supported by funds, talents, achievement incentives, etc. At the same time, under the guidance of the regional library and information work committee, we should strengthen the cooperation of information literacy education resources between regions and schools, establish the sharing system of information literacy education resources for postgraduates, and actively share information literacy education resources with regional universities, thus forming a situation of information sharing, resource sharing, complementary advantages and win-win cooperation for postgraduates.

2. With multiple resources input as the guarantee, promote the sharing of information literacy education resources.

Under the new situation, the development of information literacy education for graduate students in colleges and universities pays more attention to the quality of the process of cultivating graduate students and the improvement of their core

literacy. At present, the development of information literacy education for postgraduates in western universities is difficult to be innovative and connotative. The key lies in the lack of strong resource guarantee and intellectual support. Therefore, the input and guarantee of resources can be carried out from the following aspects: (1) the dimension of financial resources guarantee. Set up special funds, innovate talent introduction methods, strengthen the financial guarantee for information literacy education, attract information literacy education experts in a more flexible way, enrich the school information literacy teachers, and regularly invite domestic and foreign experts to conduct information literacy education training classes or intensive training classes. In particular, it is necessary to carry out information literacy training in auxiliary scientific research and academic innovation according to the characteristics of graduate information literacy education, so as to really help teachers and students master graduate information literacy knowledge. (2) Managing the dimension of resource guarantee. Set up a teaching and research section or center to manage postgraduate information literacy education, form an information literacy teaching management mode that is compatible with the characteristics of postgraduate teaching in our university, and construct the goal, development plan and specific teaching management system of postgraduate information literacy education. At the same time, we should also pay attention to the teaching needs of high-level postgraduates, and focus on cultivating outstanding talents, assisting scientific research work and innovating academic development to position postgraduate information literacy education with broad vision, high position and expertise. (3) The dimension of rich educational resources. Increase educational reform projects, scientific research projects and curriculum projects related to information literacy education in schools, strengthen the development of online educational resources in colleges and universities, enhance the willingness to share teaching resources, reduce technical barriers among educational platforms in different schools, integrate excellent online teaching resources at home and abroad, and work together to create a “golden course” that meets the needs of graduate information literacy education in the western region.

3. Supported by technological innovation and development, enrich the forms of information literacy education.

Under the background of information, digitalization and intelligence development, information literacy education for graduate students in colleges and universities should be oriented to meet the needs of graduate students of different levels and specialties, combine with the in-depth development of educational technology, integrate advanced information technology, digital technology and intelligent technology, and constantly innovate the teaching methods and means of information literacy education. (1) Explore the form of information literacy education that integrates online and offline. Constantly changing the concept of offline classroom teaching, postgraduate offline teaching should pay more attention to imparting learning methods, gradually form the lifelong learning concept of information literacy, help students form a self-learning system of information literacy, guide students to continuously improve their core literacy through online resource learning, and provide after-class face-to-face instruction, online communication, seminars and other forms to help students, thus forming an optimized integration of online and offline teaching modes. (2) Strengthen the deep integration of new educational technologies and postgraduate information literacy education, and explore teaching modes that stimulate students' learning interest. Such as flip classroom, micro-classroom, rain classroom and other educational technologies to help graduate students learn anytime and anywhere. At the same time, based on the position of graduate students, explore the gamification information literacy education mode, and impart profound, profound and boring information literacy knowledge to students in a more acceptable form, such as using virtual simulation technology to build virtual scenes, create a good information literacy education environment, and enhance students' learning interest and practice enthusiasm. (3) Actively explore embedded teaching methods, embed information literacy teaching into scientific research training and professional courses, and organically integrate information literacy education with scientific research and professional learning. At the same time, teachers guide students to form information

literacy self-help learning teams, build virtual information literacy education communities, strengthen online communication and interaction between teachers and students, solve students' learning problems in time, and form a personalized, all-weather and all-round information literacy teaching mode.

4. Take the requirements of the times as the target, and create a new pattern for the development of information literacy teachers.

It is the core force to improve the quality of postgraduate information literacy education. The lack of teachers who meet the requirements of the times and meet the academic needs of postgraduates has become a bottleneck restricting the high-quality development of information literacy education for graduate students. Teachers' professional quality and professional level are the important foundation to guarantee the quality of information literacy education. (1) Universities incorporate the training of information literacy education talents into the overall teachers' construction plan, which promotes the deep coupling between teachers' personal development and school information literacy education development. By introducing high-level teaching backbones and academic leaders, they constantly improve the graduate information literacy education teachers' structure and form a good atmosphere for teachers' professional development. (2) Strengthen the professional training of teachers and form a high-level, systematic and sustainable teacher training system. By accurately judging graduate students' information literacy education needs, paying close attention to relevant hot spots in the field of information literacy education, strengthening international and inter-school teacher exchanges and cooperation, and providing professional teaching training, scientific research training, and continuing education, we can further enrich teachers' information literacy knowledge reserve and improve teachers' information literacy teaching ability. (3) Actively promote the team construction of postgraduate information literacy teaching and research. The lack of teachers and loose teaching organization have always been the important factors that hinder the improvement of information literacy education quality of postgraduates. It is necessary for the library to further clarify the respective teaching responsibilities of full-time teachers

and part-time teachers, actively organize teachers with relevant academic backgrounds in the school, strengthen the communication and cooperation between full-time and part-time teachers through collective lesson preparation and teaching seminars, and set up a professional postgraduate information literacy teaching and research center, which is responsible for curriculum formulation, teaching reform, quality control, etc., so as to provide teachers' guarantee for the quality development of postgraduate information literacy education.

5. Optimize the content of information literacy education courses based on the needs of graduate education.

In order to further promote the information literacy education in colleges and universities to adapt to the new situation and meet the new requirements of graduate information literacy education as soon as possible, the content of graduate information literacy education needs to focus more on professional background, advanced knowledge and scientific research ability. (1) The educational content needs to comprehensively cover the macro requirements of postgraduate information literacy education. Based on the academic situation, the content of postgraduate information literacy education should be reconstructed. By referring to the curriculum system of information literacy education in foreign developed countries, combined with the "Information Literacy Framework for Higher Education" issued by ACRL and "Information Literacy Ability Standard for Higher Education", this paper provides a scientific basis for improving the compilation of teaching materials, teaching contents and assessment methods of graduate students' information literacy. (2) Based on the specific needs of graduate students in different stages of scientific research, constantly adjust the corresponding teaching content. The content of information literacy education should be organically integrated into postgraduate courses in different stages, such as topic selection, literature review, research involvement, tool application and thesis writing, so as to realize the full support of postgraduate information literacy education for postgraduate scientific research. (3) Based on the information literacy needs of graduate students of different majors, the selection of teaching materials, teaching contents and

assessment methods should be appropriately adjusted to meet the diversified needs of graduate students of different majors. (4) Keep up with the requirements of the times, dynamically adjust the content of postgraduate information literacy education, so as to keep pace with the times and meet the needs of postgraduate education. With the deepening of social informatization, the information literacy teaching content of graduate students needs to pay active attention to data literacy, media literacy, new media literacy, etc. Teachers need to pay active attention to the information literacy teaching trends at home and abroad and adjust the information literacy teaching content of graduate students in a timely manner.

6. Take the scientific evaluation mechanism of education and empower information to calculate the quality monitoring of literacy education.

The monitoring and evaluation mechanism of teaching quality in colleges and universities aims to grasp the teaching trends of postgraduate information literacy education in time, feedback and solve the problems existing in the teaching process in time. At present, there are no clear standards for the evaluation standard, quality monitoring mechanism, teaching reward and punishment mechanism and assessment standard of graduate information literacy teaching in China's colleges and universities. Colleges and universities need to build a quality supervision and evaluation system suitable for their own graduate education training plan and the development of information literacy education discipline. (1) Establish regular special inspection of postgraduate information literacy education. By holding regular teaching seminars, meetings for teachers to learn from each other, teaching supervision and other special education inspection projects, the school forms a regular, process-oriented and timely teaching quality monitoring system to help teachers find teaching problems in time, improve teaching methods and improve teaching content. (2) Improve the evaluation mechanism of students, and feedback the actual effect of postgraduate information literacy education by tracking the learning effect of students. Or the mid-term and final student evaluation is the evaluation of time point, and it has the disadvantage of subjectivity of student evaluation. Therefore, it is necessary to make full use of big data, new media and

other analytical technologies to track the whole process of information literacy teaching, and take pre-teaching test and post-teaching test for graduate students to compare and analyze the objective situation of information literacy teaching effect of graduate students. (3) Pay attention to coordinating the relationship between teaching quality monitoring and teacher performance appraisal. The evaluation results of education quality are directly related to teachers' salary income, so it is necessary to improve the authenticity of teaching quality evaluation. By expanding the evaluation subject, enriching the evaluation methods and innovating the evaluation means, teachers' teaching situation can be objectively and truly reflected, and on this basis, the labor-capital matching of performance distribution can be reflected, so that the monitoring and evaluation of education quality can become a positive motivation for teachers to invest in postgraduate information literacy education, fully mobilize teachers' subjective initiative, and promote the continuous improvement of the quality of teaching and research work of postgraduate information literacy education.

Future Researches

This study focuses on the research on the development strategy of information literacy education for postgraduates in universities in Guizhou Province. Through investigation, research and statistical analysis, the conclusions reached are basically consistent with the previous high-level literature. The research methods have been expanded, and the research objects have filled in the blind area. With the continuous development of the Internet and the continuous improvement of the development requirements of postgraduate education, postgraduate information literacy education is still a focus topic, especially in the following aspects need further research:

Research Perspective: Applying Educational Management Science and Administrative Power

At present, postgraduate education has been transformed into a connotative development, but the information literacy education layer remains in the process of quantitative change, and it is urgent to move from the testing area to the deep water area, which requires the guidance and guidance of advanced and systematic educational

management theoretical research, and contradiction The fact is that theoretical research is relatively single or fragmented, and systematic research is extremely scarce, making it difficult to guide and support practical development, and it also restricts the leapfrog development of postgraduate information literacy education. At the same time, the existing research lacks the manager's perspective and administrative means, and the modern education management science has not been effectively applied. At present, the planning and implementation of information literacy education for postgraduates relying solely on the library is obviously "impossible". It is necessary to improve the position, and it is urgent to strengthen the top-level design, incorporate it into the overall planning at the school level, and strengthen the overall coordination and effective intervention of administrative forces. Therefore, higher education is required. Only by doing relevant research and research in advance can the industry provide directional guidance and decision-making reference.

Research object: precise positioning of postgraduate education coordinate system

In the standards of information literacy requirements for graduate students and undergraduates, the basic requirements for information awareness, information ability and information ethics are the same, but because graduate students directly participate in scientific research, the requirements for their information literacy are higher, mainly focusing on scientific research Methods, professional information acquisition, evaluation and utilization, and academic ethics. Undergraduates focus on the cultivation of information awareness, information knowledge, basic information ability and information ethics, so that they have basic information literacy ability, can understand the role and value of information, have perception of effective information, can accurately express information needs, and The ability to properly use retrieval methods to obtain the required information and to correctly evaluate and use it effectively has different training objectives, and the training environment and orientation are also significantly different. While classifying and training, we should also pay attention to organic connection and integration, that is, postgraduate information literacy education should be organically connected with undergraduate

information literacy education. Provide education in scientific research methods, professional information acquisition and evaluation, journal evaluation, academic ethics, and academic norms. Therefore, future research on information literacy education for postgraduates must first fully understand the unique attributes of postgraduate education and the significant differences from undergraduate education, so as to ensure the reliability and accuracy of the research.

Research content: expand the research dimension of information literacy education

It comprehensively expands the existing single-factor theoretical research, and proposes that systematic research refers to an organism that promotes, integrates and interacts with each other. This is also the top-level design for the development of postgraduate information literacy education. In the information literacy education ecosystem, cultivating the three major abilities of graduate students' judgment, analysis, and research has always been the core goal of information literacy education. This ecosystem can be penetrated and integrated to form a complete system of information literacy. The specific investigation and research can be divided into four aspects: information awareness, information knowledge, information ability and information ethics. Finally, the "six-in-one" linkage mechanism is used to propose a scientific and comprehensive development path for information literacy education, which comprehensively covers six dimensions, including education macro planning, education management model, resource investment guarantee, teacher team construction, teaching platform construction, and quality supervision and evaluation. From the connotation dimension of postgraduate information literacy education to the construction dimension, it is a multi-level organic community, so as to ensure that the research content meets the requirements of the times.

Research Context: Actively adapt to new policies and new formats of higher education

With the development of the times, information literacy education in universities has been continuously injected with new connotations, postgraduates are the top of the national sequence education, and the society's requirements and

expectations for postgraduates have also increased. Policies are in line with new business formats, such as the concepts of “new liberal arts”, “new engineering”, “integration of production and education”, and “integration of science and education” currently being promoted, taking into account the classified training of postgraduates, and achieving strong support with information capabilities Professional learning, scientific research, and innovative development, while postgraduate information literacy education should meet the new requirements for high-level talent information literacy levels in different eras, such as the era of big data requires efficient retrieval and utilization of information. Therefore, postgraduate information literacy education requires higher education workers to maintain a keen or even advanced awareness, explore the significant advantages of postgraduate information literacy education development, seize opportunities, internal and external linkages, and make up for the “historic” shortcomings of postgraduate information literacy education.

Research methods: scientifically improve the measurement method of information literacy level

In terms of research methods, existing research is generally limited to qualitative research, few studies use quantitative research, and the relevant research conclusions lack support. Information literacy is a diverse concept including awareness, knowledge, competence, and morality, which is difficult to measure by a single and traditional means (Curtis et al., 2015). Most of the sample literature is measured by questionnaire survey and interview method. Although this method is relatively simple and low in cost, its randomness and subjectivity are too strong, and its accuracy and reliability need to be improved. At the same time, relying on purely qualitative methods, the research conclusions lack scientificity and applicability, so the combination of quantitative and qualitative research is strengthened. With the gradual implementation of concepts and technologies such as artificial intelligence and formative assessment in the field of education, it will become an important development trend to use multimodal data such as video data, log data, physiological responses, and observation and evaluation to observe students’ information literacy performance (Sharma et al., 2019). Therefore, when evaluating the information literacy level of postgraduates, combining traditional

methods with situational responses, organically integrating result orientation and formative evaluation, it will hopefully break through the bottleneck of information literacy level evaluation.

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Appendixes

Appendix A

List of Specialists and Letters of Specialists Invitation for IOC Verification

List of Specialists for IOC Verification

1.Mr.Wang Xiang	Degree : Doctor of education Position: GuiZhou Normal University, Professor
2.Mr.Bao Zhongyi	Degree : Doctor of education Position: ZunYi Medical University, Professor
3.Mr.Yang Lichang	Degree : Doctor of education Position: Guizhou Academy of Education Sciences, Professor

Letters of Specialists Invitation for IOC Verification

ที่ อว ๐๖๔๓.๑๔/๐๐๑

มหาวิทยาลัยราชภัฏบ้านสมเด็จเจ้าพระยา
๑๐๖๑ ถนนอิสรภาพ แขวงหิรัญรูจี
เขตธนบุรี กรุงเทพมหานคร ๑๐๖๐๐

๕ ตุลาคม ๒๕๖๕

เรื่อง เชิญเป็นผู้เชี่ยวชาญตรวจสอบความตรงเชิงเนื้อหาเครื่องมือในการทำวิทยานิพนธ์

เรียน Professor Wang Xiang
Guizhou Normal University

สิ่งที่ส่งมาด้วย ๑. เค้าโครงวิทยานิพนธ์ จำนวน ๑ เล่ม
๒. แบบสอบถาม จำนวน ๑ ชุด

เนื่องด้วย Mr. Shen Yang นักศึกษาระดับบัณฑิตศึกษา หลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาการบริหารการศึกษา มหาวิทยาลัยราชภัฏบ้านสมเด็จเจ้าพระยา ได้รับการอนุมัติให้ดำเนินการวิจัยดุษฎีนิพนธ์เรื่อง “The Development Strategy of Information Literacy Education for Postgraduates in Universities in Guizhou Province” โดยมีคณะกรรมการที่ปรึกษาดุษฎีนิพนธ์ ดังนี้

๑. รองศาสตราจารย์ ดร.นิรันดร์ สุธีนิรันดร์ ประธานที่ปรึกษาหลัก
๒. รองศาสตราจารย์ ดร.จิตตวิสุทธิ์ วิมุตติปัญญา อาจารย์ที่ปรึกษาร่วม
๓. ผู้ช่วยศาสตราจารย์ ดร.กุลสิรินทร์ อภิรัตน์วรเดช อาจารย์ที่ปรึกษาร่วม

ในการทำดุษฎีนิพนธ์ครั้งนี้ นักศึกษาจำเป็นต้องตรวจสอบความตรงเชิงเนื้อหา (Content Validity) ของเครื่องมือ เพื่อให้ได้เครื่องมือที่สมบูรณ์ที่สุด ทางบัณฑิตวิทยาลัยได้พิจารณาเห็นว่าท่านเป็นผู้ทรงคุณวุฒิ มีความรู้ความสามารถสอดคล้องกับหัวข้อการทำสารนิพนธ์ดังกล่าวเป็นอย่างยิ่ง ซึ่งคำแนะนำของท่านจะเกิดประโยชน์ต่อการปรับปรุงแก้ไขในการสร้างเครื่องมือสำหรับการวิจัยของนักศึกษาให้มีคุณภาพและเหมาะสมเพื่อใช้ในการเก็บรวบรวมข้อมูลในการวิจัยต่อไป

จึงเรียนมาเพื่อโปรดพิจารณาให้ความอนุเคราะห์แก่นักศึกษาด้วยจะเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.คณกร สว่างเจริญ)
คณบดีบัณฑิตวิทยาลัย

งานประสานบัณฑิตศึกษา
โทร. ๐-๒๔๗๓-๗๐๐๐ ต่อ ๑๘๑๔

ที่ อว ๐๖๔๓.๑๔/๐๐๒

มหาวิทยาลัยราชภัฏบ้านสมเด็จเจ้าพระยา
๑๐๖๑ ถนนอิสรภาพ แขวงหิรัญรูจี
เขตธนบุรี กรุงเทพมหานคร ๑๐๖๐๐

๕ ตุลาคม ๒๕๖๕

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เรียน Professor Bao Zhongyi
Zunyi Medical University

สิ่งที่ส่งมาด้วย ๑. เค้าโครงวิทยานิพนธ์ จำนวน ๑ เล่ม
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ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.คณกร สว่างเจริญ)
คณบดีบัณฑิตวิทยาลัย

งานประสานบัณฑิตศึกษา
โทร. ๐-๒๔๗๓-๗๐๐๐ ต่อ ๑๘๑๔

ที่ อว ๐๖๔๓.๑๔/๐๐๑

มหาวิทยาลัยราชภัฏบ้านสมเด็จเจ้าพระยา
๑๐๖๑ ถนนอิสรภาพ แขวงหิรัญรูจี
เขตธนบุรี กรุงเทพมหานคร ๑๐๖๐๐

๕ ตุลาคม ๒๕๖๕

เรื่อง ขอความอนุเคราะห์เก็บข้อมูลโดยการเข้าสัมภาษณ์

เรียน ผู้เชี่ยวชาญ

สิ่งที่ส่งมาด้วย ๑. แบบสัมภาษณ์ จำนวน ๑ เล่ม

เนื่องด้วย Mr. Shen Yang นักศึกษาระดับบัณฑิตศึกษา หลักสูตรครุศาสตรดุษฎีบัณฑิต สาขาวิชาการบริหารการศึกษา มหาวิทยาลัยราชภัฏบ้านสมเด็จเจ้าพระยา ได้รับการอนุมัติให้ดำเนินการวิจัยดุษฎีนิพนธ์เรื่อง “The Development Strategy of Information Literacy Education for Postgraduates in Universities in Guizhou Province” โดยมีคณะกรรมการที่ปรึกษาดุษฎีนิพนธ์ ดังนี้

๑. รองศาสตราจารย์ ดร.นิรันดร์ สุธีนิรันดร์ ประธานที่ปรึกษาหลัก
๒. รองศาสตราจารย์ ดร.จิตตวิสุทธิ์ วิมุตติปัญญา อาจารย์ที่ปรึกษาร่วม
๓. ผู้ช่วยศาสตราจารย์ ดร.กุลสิรินทร์ อภิรัตน์วรเดช อาจารย์ที่ปรึกษาร่วม

ในการนี้คณะกรรมการบริหารหลักสูตรฯ ได้พิจารณาเห็นว่าท่านเป็นผู้เชี่ยวชาญที่มีความรู้ความสามารถที่จะให้ข้อมูล คำแนะนำอันเป็นประโยชน์ต่อการประเมินความเหมาะสมและความเป็นไปได้ของนักศึกษาได้เป็นอย่างดี จึงขออนุญาตให้นักศึกษาเข้าสัมภาษณ์ และกำหนดวันเวลาแก่นักศึกษาที่ท่านสะดวก

จึงเรียนมาเพื่อโปรดพิจารณาให้ความอนุเคราะห์แก่นักศึกษาด้วยจะเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.คณกร สว่างเจริญ)
คณบดีบัณฑิตวิทยาลัย

งานประสานบัณฑิตศึกษา
โทร. ๐-๒๔๗๓-๗๐๐๐ ต่อ ๑๘๑๔

Appendix B

Questionnaire

Questionnaire

Factors Influencing the Quality of Information Literacy Education for Postgraduates in Universities

Num	Factors Influencing the Quality of Information Literacy Education for Postgraduates in Universities	5	4	3	2	1
	Development planning and administrative management					
1	Information Literacy Education for Postgraduates is included in the overall development plan of the school					
2	Have a special management department or management team					
3	The development objectives and management system have been scientifically formulated					
4	Educational development programs emphasize the distinction between postgraduates and undergraduate students					
5	The education development plan defines long-term and short-term goals					
	Form of Education					
1	Build a perfect "Online + offline" mixed teaching mode					
2	In addition to classroom teaching, expand and open forums, salons, lectures and other forms					
3	Constantly innovate and reform new teaching paradigm					
4	Pay attention to the combination of theoretical teaching and practical exercise					
5	Combine the new situation to innovate the teaching paradigm constantly					

Num	Factors Influencing the Quality of Information Literacy Education for Postgraduates in Universities	5	4	3	2	1
	Resource input guarantee					
1	With special construction funds					
2	A complete teaching platform or practice base has been established					
3	A perfect practice base has been created					
4	Approved curriculum construction project or teaching reform project					
5	To construct a perfect information literacy education curriculum system for postgraduates					
	Construction of teaching staff					
1	The professional structure of teachers is reasonable (mainly based on the background of higher education and Library and Information Science)					
2	The professional title structure of teachers is reasonable					
3	The educational structure of teachers is reasonable					
4	Arrange teachers to receive professional training and continuing education					
5	The proportion of full-time and part-time teachers is reasonable					
	Education content construction					
1	The education content fully covers the macro requirements of information literacy education, including information ethics, information ethics, information ability, information awareness, etc					

Num	Factors Influencing the Quality of Information Literacy Education for Postgraduates in Universities	5	4	3	2	1
2	The education content fully covers the specific requirements of scientific research practice activities, including literature retrieval, postgraduate research methods, intellectual property protection and utilization, paper writing and journal submission, etc					
3	The education content fully covers the core literacy requirements of graduate students, including scientific research literacy, data literacy, media literacy, etc					
4	The teaching content is specially designed for postgraduates of different majors					
5	The teaching content meets the requirements of the new situation for postgraduates					
	Evaluation and optimization of educational quality					
1	The school regularly organizes special inspections on Information Literacy Education of postgraduates					
2	Regularly hold meetings or teaching seminars for mutual benefit of teaching and learning					
3	Regularly measure the effect of information literacy education for postgraduates					
4	Organize teaching supervision experts to carry out teaching evaluation and guidance in class regularly					
5	Organize postgraduates to evaluate and feedback information literacy education regularly					

Appendix C
Assessment Form

Assessment Form

Evaluation table of development strategies of information literacy education for postgraduates in universities in Guizhou Province

Development strategies of information literacy education for postgraduates in colleges and universities in Guizhou Province by using modern higher education management science	**5**	**4**	**3**	**2**	**1**
Integrate postgraduate information literacy education into the overall development plan of the university					
Establish a professional management department or management team (emphasizing clear division of labor and cooperation)					
Develop a scientific management system for postgraduate information literacy education					
Development plan should clearly distinguish between graduate students and undergraduates					
Educational development planning should clearly distinguish between long-term goals and short-term					
Build an integrated online and offline information literacy education mode for postgraduates					
Teaching methods are tailored to postgraduates					
Pay more attention to the reform and innovation of teaching paradigm					
Pay more attention to combining theory with practice					
Make full use of multimedia to carry out teaching					
Special construction funds should be allocated					

Development strategies of information literacy education for postgraduates in colleges and universities in Guizhou Province by using modern higher education management science	5	4	3	2	1
Build an information literacy education platform for postgraduates					
Build the practice base of information literacy education for postgraduates					
Construct and perfect the curriculum system of postgraduate information literacy education					
Approve the relevant curriculum construction projects					
Optimize the professional background of teachers (vigorously introduce teachers with professional					
Optimize the rank structure of information literacy teachers					
Optimize the age echelon of information literacy teachers (mainly refers to the working years)					
Optimize the proportion of full-time and part-time teachers					
Improve the continuing education system for teachers					
Improve the pertinence of teaching content for postgraduates					
Improve the differentiation of teaching content of different majors					
Meet the needs of postgraduate research activities					

Development strategies of information literacy education for postgraduates in colleges and universities in Guizhou Province by using modern higher education management science	5	4	3	2	1
Meet the requirements of postgraduate core literacy					
Adapt to the requirements of training graduate students in the new media era					
Schools should carry out regular inspection of information literacy education for postgraduates					
Collect graduate students' satisfaction with information literacy education regularly(including opinions and					
Improve the supervision mechanism integrating evaluation, examination and incentive					
Experts should be organized to evaluate and guide teaching in the classroom					
Teaching seminars should be held regularly (attended by administrators, teachers and graduate students at the					

Appendix D
The Results of the Quality Analysis of Research Instruments

Result of IOC

Num	Factors Influencing the Quality of Information Literacy Education for Postgraduates in Universities	IOC
Development planning and administrative management		
1	Information Literacy Education for Postgraduates is included in the overall development plan of the school	1.00
2	Have a special management department or management team	1.00
3	The development objectives and management system have been scientifically formulated	1.00
4	Educational development programs emphasize the distinction between postgraduates and undergraduate students	1.00
5	The education development plan defines long-term and short-term goals	1.00
Form of Education		
1	Build a perfect "Online + offline" mixed teaching mode	1.00
2	In addition to classroom teaching, expand and open forums, salons, lectures and other forms	1.00
3	Constantly innovate and reform new teaching paradigm	1.00
4	Pay attention to the combination of theoretical teaching and practical exercise	1.00
5	Combine the new situation to innovate the teaching paradigm constantly	0.67

Num	Factors Influencing the Quality of Information Literacy Education for Postgraduates in Universities	IOC
Resource input guarantee		
1	With special construction funds	1.00
2	A complete teaching platform or practice base has been established	1.00
3	A perfect practice base has been created	1.00
4	Approved curriculum construction project or teaching reform project	0.67
5	To construct a perfect information literacy education curriculum system for postgraduates	0.67
Construction of teaching staff		
1	The professional structure of teachers is reasonable (mainly based on the background of higher education and Library and Information Science)	1.00
2	The professional title structure of teachers is reasonable	1.00
3	The educational structure of teachers is reasonable	1.00
4	Arrange teachers to receive professional training and continuing education	1.00
5	The proportion of full-time and part-time teachers is reasonable	1.00
Education content construction		

Num	Factors Influencing the Quality of Information Literacy Education for Postgraduates in Universities	IOC
1	The education content fully covers the macro requirements of information literacy education, including information ethics, information ability, information awareness, etc.	1.00
2	The education content fully covers the specific requirements of scientific research practice activities, including literature retrieval, research methods, paper writing and submission, etc.	1.00
3	Covers the core literacy requirements of postgraduates, including scientific research literacy, data literacy, etc	1.00
4	The teaching content is specially designed for postgraduates of different majors	1.00
5	The teaching content meets the requirements of the new situation for postgraduates	1.00
Evaluation and optimization of educational quality		
1	The school regularly organizes special inspections on Information Literacy Education of postgraduates	1.00
2	Regularly hold meetings or teaching seminars for mutual benefit of teaching and learning	1.00
3	Regularly measure the effect of information literacy education for postgraduates	1.00
4	Organize teaching supervision experts to carry out teaching evaluation and guidance in class regularly	1.00
5	Organize postgraduates to evaluate and feedback information literacy education regularly	1.00
Total		**0.98**

Reliability Analysis for Research Instrument

The main influencing factors of information literacy education quality for postgraduates in colleges and universities in Guizhou Province

Reliability statistics

Cronbach's Alpha	Cronbachs Alpha based on standardized items	Number of terms
.929	.912	30

Kmo & Bartlett test

Kaiser-meyer-olkin measure of sampling adequacy		.888
Bartlett's test of sphericity	Approx. Chi-Square	4025.260
	df	435
	Sig.	.000

Item total statistics

	Item Indicates the mean value of the deleted scale	Item has removed the scale variance	Corrected item total correlation	Item deleted Cronbach's Alpha value
q1.1	137.79	73.611	.075	.930
q1.2	137.82	73.482	.077	.930
q1.3	138.02	68.191	.740	.924
q1.4	138.05	67.600	.736	.924
q1.5	138.28	63.381	.828	.921
q2.1	137.79	73.493	.134	.930
q2.2	137.93	69.422	.699	.925
q2.3	138.04	68.415	.705	.924
q2.4	138.02	68.678	.634	.925
q2.5	138.29	63.827	.805	.922
q3.1	137.81	73.549	.059	.930
q3.2	137.95	69.128	.720	.925
q3.3	138.09	64.334	.831	.922
q3.4	138.03	67.562	.739	.924
q3.5	138.31	63.523	.801	.922
q4.1	137.81	73.760	.009	.930
q4.2	137.80	73.779	.010	.930
q4.3	138.28	63.590	.686	.925
q4.4	138.01	68.558	.703	.924
q4.5	138.20	65.752	.773	.923
q5.1	137.81	73.702	.028	.930
q5.2	137.83	72.926	.191	.929
q5.3	137.84	72.406	.290	.929
q5.4	138.31	68.157	.305	.935
q5.5	138.09	67.624	.643	.925
q6.1	137.82	73.783	.000	.930
q6.2	137.93	69.408	.692	.925
q6.3	137.90	70.961	.422	.928
q6.4	138.11	67.359	.717	.924
q6.5	138.29	65.011	.763	.923

Development strategies of information literacy education for postgraduates in universities in Guizhou Province

Reliability statistics

Cronbach's Alpha	Cronbachs Alpha based on standardized items	Number of terms
.850	.832	30

Item total statistics

	Item Indicates the mean value of the deleted scale	Item has removed the scale variance	Corrected item total correlation	Item deleted Cronbach's Alpha value
q1.1	135.25	55.250	.414	.845
q1.2	135.20	57.432	.068	.852
q1.3	135.20	55.747	.268	.848
q1.4	135.40	54.042	.509	.842
q1.5	135.70	52.747	.429	.844
q2.1	135.10	57.779	.034	.851
q2.2	135.35	55.818	.271	.848
q2.3	135.20	56.800	.183	.850
q2.4	135.65	51.397	.553	.839
q2.5	135.40	55.095	.241	.850
q3.1	135.30	55.905	.277	.848
q3.2	135.35	54.976	.312	.847
q3.3	135.25	57.355	.068	.852
q3.4	135.75	50.092	.636	.835
q3.5	135.40	52.884	.416	.844
q4.1	135.15	56.239	.349	.847
q4.2	135.70	51.168	.526	.840
q4.3	135.40	51.937	.575	.839
q4.4	135.45	53.839	.427	.844
q4.5	135.40	52.568	.506	.841
q5.1	135.50	52.684	.481	.842
q5.2	135.20	55.747	.268	.848
q5.3	135.40	55.200	.275	.848
q5.4	135.25	55.250	.311	.847
q5.5	135.70	49.484	.625	.835
q6.1	135.25	55.987	.291	.848
q6.2	135.15	58.239	-.083	.854
q6.3	135.35	54.766	.337	.846
q6.4	135.35	53.924	.440	.843

Appendix E

Certificate of English

มหาวิทยาลัยราชภัฏบรมราชชนนี

Bansomdejchaopraya Rajabhat University

This is to certify that

MR. SHEN YANG

Achieved BSRU-TEST of English Proficiency (BSRU – TEP) level

C 1

Given on 20th January 2020

Linda Gainma

(Assistant Professor Dr. Linda Gainma)

President

Appendix F

The Document for Acceptance Research

Letter of SCI Journal Acceptance

Medicine®

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https://journals.lww.com/md-journal/pages/default.aspx

Dear Authors,

The Editorial Board of ***Medicine*** hereby states with great pleasure that following the reviewing process, your below indicated manuscript has been accepted for publication in ***Medicine***. The technical editing will start after the receipt of payment.

Title of paper: Research on Development Strategies of Information Literacy Education for Postgraduates in Universities in the New Era

Author(s): Shen Yang, Niran Sutheenira, Jittawisut Wimuttipanya, Kulsirin Aphiratvoradej, Wang Xiang

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